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A Better Feeling in Steel

Buying of Basic and Bessemer Pig Iron

In Foundry Iron the Approach to Low Point Has Brought More Activity

Some of the week's developments, particularly railroad buying, have contributed to a better feeling in the steel trade. Concerning pig iron, the best that can be said is that at lower prices somewhat more business has been done, and assertions that bottom is being reached are made with more confidence.

The prevalent idea concerning the cutting down of pig iron output exaggerates its extent. Counting furnaces that have actually blown out, the movement represents scarcely more than 10 per cent. off the rate of production on April 1, and furnaces now scheduled to go out will not increase it beyond 12 per cent. The United States Steel Corporation now has 31 idle furnaces out of a total of 119, having blown out one additional furnace, that at Niles, Ohio, in the past week.

Pig iron inquiry has increased most in the East, where 35,000 to 40,000 tons is pending, a total that seems large only in comparison with the beggarly buying of many weeks. Along with reports that certain low offers are refused by the furnaces come others showing that new low points have been touched; for example, \$11.50, at Birmingham, for No. 2 foundry iron. Two sellers are reported to have accepted this price on prompt iron, but \$12 is commonly quoted for second half delivery. Efforts of pipe foundries to buy considerable lots of No. 3 at \$11.25 and of No. 4 at \$11 for the second half have not been as successful as expected. In southern Ohio sales of No. 2 iron have been made at \$15, Ironton. Buffalo and Cincinnati report an increase in pig iron sales and inquiry.

At Pittsburgh the market for Bessemer and basic pig iron has been in commotion, with active manipulation by buyers to break through recent levels. Sales of several thousand tons of Bessemer iron are reported at \$16.25, Valley furnace, and basic has sold in 5000-ton lots at \$15. There are heavy stocks at Valley furnaces which will not be readily absorbed without severe curtailment of production.

The better sentiment in finished lines is due to the placing of good car and locomotive orders and the expectation of other railroad buying to follow; also to the additional contracts for bars for Western agricultural works, amounting to 150,000 tons. The cars for the Harriman lines have at last been placed, and are for a total of 12,440, of which the American Car & Foundry Company will build nearly 11,000. The Hawley lines have bought 72 locomotives.

Plates and shapes show further weakness, Eastern plate mills being active competitors in the Central West. New structural contracts include 8000 tons, for

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Mechanical and Civil Engineers
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the Bankers' Trust Company Building, New York, taken by the American Bridge Company. The Big Four Railroad has awarded the building of its new shops at Beach Grove, near Indianapolis, requiring 6000 tons of steel, to the McClintic-Marshall Construction Company. Plate contracts for new vessels, amounting to 10,000 to 12,000 tons, have been placed by Eastern yards, and bids are being taken on two additional steamers for the West Indian trade.

There are no large new rail contracts, but the Ensley, Pittsburgh, Colorado and Chicago district mills have booked 12,500 tons in small orders the past week, while light rail business has been more active.

The eastern Pennsylvania wrought iron pipe manufacturers emphatically deny that they have reduced their prices, the reduction announced last week having been made by Pittsburgh mills.

Merchant pipe has taken on new life. Among orders taken by the leading interest in the past 10 days are 3000 tons of oil well casing for California, 40 miles of 20-in., 15 miles of 16-in. and 25 miles of 10-in. pipe for gas lines, and 20 miles of 6-in. pipe for an oil line.

The arrangement by which the Eastern steel mills have bought their scrap through one channel is on a better footing. One interest which for some weeks has been buying for itself is again co-operating.

The Duplex Steel Process

The increasing employment of the Bessemer converter and the basic open hearth furnace jointly in the production of steel should give in time some authentic data as to the economies of the duplex process. In some instances the existence of Bessemer plant which could not profitably be employed except as an adjunct of the open hearth is the determining consideration. In others where Bessemer converters are built expressly to serve open hearth furnaces, the investment is made, it may be assumed, after a careful canvass of the savings to be secured from the largely increased steel output and from greater leeway in blast furnace working—savings considerably exceeding the interest on the greater first cost plus higher percentage of metal loss. In still other cases local conditions—the character of ores or lack of cheap scrap, for example—are the determining factors.

Thus far the duplex process has been almost entirely employed in this country in the manufacture of rail steel. Naturally it has received some consideration from railroad engineers in view of the attention they have paid in recent years to the processes of steel manufacture. The fact that at least one railroad specification calls for the use of "the straight open hearth process" in the manufacture of its rails indicates a certain vague feeling that all steel works methods which increase output involve possibilities of detriment to the quality of the metal. But nothing has developed in actual practice at duplex plants warranting any such restriction as that cited. The time the metal is held in the open hearth furnace is not necessarily a gauge of quality.

In this connection interest attaches to the installation now being made at a Canadian rail mill, as referred to elsewhere in this issue, preparatory to the operation of a triplex process. Here all the metal passes through two open hearth furnaces, with an intermediate blow in a basic Bessemer converter, while

the final reactions are reserved for the ladle, making in reality four refining operations. The phosphorus content of the ores is such as to make the basic Bessemer process available in this case, though the minimum of 1.50 per cent. phosphorus in the pig iron is below what is tolerated for basic Bessemer practice in Europe, and is still more below what is desired. Apropos of the large expenditure on this installation for the triplex process at Sydney, Nova Scotia, is the proposal that has been considered by one steel company in this country—namely, a three process plant. This plan, differing from that at Sydney, calls for the treatment of the metal in two converters, acid and basic, with final refining in a basic open hearth furnace. The pig iron is not now sufficiently high in phosphorus for the employment of the basic Bessemer process, but it is proposed to bring up the phosphorus by phosphoric slag additions to the blast furnace charge.

It is evident that the limit has not yet been reached in steel furnace outputs. As lower grade ores must constantly be reckoned with, mechanical and metallurgical engineers may be expected to find means not only of maintaining the old tonnage records, but of exceeding them.

Apprenticeship Laws Need Modernizing

The laws governing apprenticeship now on the statute books of most of the States are obsolete in many particulars, and in some instances have stood in the way of a satisfactory solution of a question which is of growing importance. Apprenticeship in former days was an institution very different from that of the present. Then a boy was bound out to his employer for a long term, usually during his minority. The master combined the powers of the parent and the employer. The boy's monetary recompense was little, if anything. He learned his trade thoroughly and this was considered his reward, but in return he had been a source of some profit to his master. To-day the limited apprenticeship is all that survives. The boy contracts to serve two or three or four years, always for a wage, which increases with his experience, these details being stipulated in the indenture papers. Naturally, laws designed for the old system apply but poorly to the new.

To illustrate the inconsistency, in some States there is doubt as to whether the employer has the right to hold back a portion of the apprentice's wages in lieu of the cash bond which guarantees the fulfillment of the term of service. This is almost a vital matter. Many employers hold, basing their opinion upon experience, that a better average of apprentices is recruited from the class of boys that cannot get the \$50 or more for deposit as a bond. They have usually been compelled to shift for themselves to a greater or less extent. They are dependent for a living upon their own efforts. The stimulus to their apprenticeship is ambition rather than parental influence. When they graduate as journeymen they are more apt to continue in the routine of the shop, being content to advance gradually. But they cannot procure the required bond money, and the employer must have some guarantee that they will continue to the end of the agreed term for the sake of the boys, and for his own because it is during the latter portion of the period that the service of the apprentice is valuable. Therefore the plan has

been adopted of deducting a certain part of the wages until the fund has been established, reverting to the boy when he has passed to the journeyman class. If this cannot be done legally, then he would be able to break his agreement and recover the funds in his employer's hands. Probably it is legal in most States, but all doubts should be removed by statute. Other obscurities should be cleared away.

Legislative study of the questions involved would result in a code of laws which would take care of the necessities of the situation as it now exists. Probably this will not be attempted until some powerful organization, such as the National Metal Trades Association or the National Machine Tool Builders' Association, shall take the initiative in the form of a request. Should one State create practical, liberal laws others would follow until the statutes would be essentially uniform, serving the mutual welfare of the employer and his apprentices.

Merchant Bar Specifications

The continuous bar mill has become a very important factor in the bar trade, as it now contributes, perhaps, 75 per cent. of the total output of soft steel bars. Its advantages over the old style mills in economy and larger production are well known, but it has limitations which have proved embarrassing to large consumers during the past year. When customers are waiting for deliveries it is an expensive operation to change the rolls on a continuous mill. The labor expense is, of course, not a serious item, but considerable time is lost which runs into large figures in the business that might be done by such a mill. This means a loss of profit to the mill and possibly a loss to customers, whose deliveries are delayed.

The custom that has been followed by industrial consumers in the purchase of bars grew up in the days of the old style merchant mills. The manufacturing buyer makes a contract for a definite period for the tonnage which he estimates he will need and gives specifications each month for the particular sizes or shapes he requires. This plan adjusts itself to the needs of the manufacturer of bolts or agricultural implements, who cannot foretell with certainty what particular style or size of his product will sell in the largest quantities. By giving monthly specifications he can obtain the quantity needed of each size or shape without taking the speculative risk of carrying a large stock of any particular size. During the past winter, however, consumers of bars have made bitter complaints regarding their deliveries, as they have been unable to obtain promptly from the mills the odd sizes and sections called for in their monthly specifications.

The agricultural trade requires an almost infinite variety of sizes and special shapes in merchant mill product. One mill rolls 23 different sections of plow beams alone, and altogether there are several hundred sizes and bar mill sections that are used regularly in agricultural implements. The time lost in changing rolls to accommodate all the customers of a mill thus becomes a very serious element in the matter of deliveries, as well as in the cost of production in the mill. Some of the largest consumers of bars in the West have been obliged to purchase from store in quantities in order to keep their business going, the most unfortunate results having occurred where con-

sumers with a great variety in their specifications were depending on continuous mills.

It is understood that some large bar consumers will protect themselves in the future by abandoning the plan of monthly specifications, and adopting a policy that will be more in harmony with economy of operation of the continuous mill. Instead of furnishing monthly specifications on a blanket contract, they are now specifying three to six months' requirements of each size or section, and in some cases complete specifications for the entire tonnage are given at the time contracts are placed. This enables the mills to make long runs without changing rolls, increases very materially the capacity, as well as promoting economy in operation. It may be necessary for the customer to carry a larger stock of bar material, but the interest on the money so used will be a small factor when compared with the losses incurred by inability to get deliveries when they are needed. The smaller consumer will be more likely under this plan to receive attention for his requirements than during the congested condition that has prevailed in the bar mills during the past six or eight months. There is a growing tendency, however, among the merchant bar interests to decline quotations on small orders for soft steel bars, and the buyer finds it necessary in such cases to purchase from store if he wants prompt delivery. Jobbers who carry large stocks are able to specify in advance for large quantities of this particular size or section, and in many cases they are able to divert carload shipments from the mills of material due on their orders. In the past winter manufacturing consumers of bars found themselves so short of material that they used rough wire rods in place of the usual small finished rounds, and wire rods were also used extensively in concrete reinforcement. Last year the mills were so anxious to book large orders, after a long and unprofitable dull period, that the question of specifications did not receive serious consideration, but buyers as well as the steel manufacturers will now profit by the experience gained in the congestion of recent months.

Our Patent Agreement With Germany

Germany is becoming impatient over the operation of its patent agreement with the United States. Under it a distinct discrimination exists in favor of Americans in Germany as against the Germans themselves. Under the agreement the American patentee has the same rights in Germany that the German has in the United States, as was fully set forth in an article on international patent law in *The Iron Age* of March 24, page 690. Therefore, as the German has no compulsory working clause to endure in America, the American is the one exception to the rule of that clause of the German law. The German must work his patent at home, or it may be canceled. The American is free to do as he pleases in this respect. When the agreement was made it was presumed that the agitation in favor of a compulsory working clause in the American patent law would result in legislation, but the matter has been permitted to drop.

The dissension in Germany has been accentuated by a recent decision of the Reichsgericht in a case where application was made to revoke a patent held by a Berlin company on the ground that it had not been worked in Germany within the stipulated period of three years.

Before the appeal was heard the company transferred the patent to the American parent company, and the Reichsgericht held that the transfer was lawful, and that as a consequence the patent could not be canceled, as the patent treaty of 1909 does not bind the United States to the limitations of the German law. The conclusion from this final decision, as drawn by interested persons abroad, is that foreigners domesticated in Germany can escape the compulsory working clause merely by assigning their patents to manufacturers in the United States. We doubt very much if the treaty would permit of a wholesale use of such means of avoiding the German law, though doubtless in many cases of patents held by American citizens the decision quoted has a significant bearing.

The German government, however, does not propose to continue a policy of discrimination against its own people in favor of those of another nation. When the matter was brought before the Reichstag recently the Secretary of State expressed the hope that, after receiving petitions and hearing representations, he would be able to publish this year particulars of a provisional bill for the reform of patent legislation. "The failure of the United States to proceed with the compulsory working clause," he stated, "has produced a condition of imparity between the Germans and citizens of the United States in Germany, and an end must be put to this situation. It is therefore intended to propose an amendment whereby compulsory working for internal patentees in Germany will be abandoned, but it will remain in operation in the country for such patents as are only worked abroad."

The meaning of this statement is that the home discrimination against the German inventor will be removed. Apparently the present status in Germany of an American patentee is not to be changed. The American, of course, receives no greater favors than those granted by the United States to the citizens of Germany.

United Engineering Improvements.—The United Engineering & Foundry Company, Pittsburgh, will make extensive changes at its plants at Youngstown, Ohio, during the next three or four months. It is the intention to discontinue the making of iron castings at its Lloyd-Booth Works in South Phelps street about August and concentrate all of its foundry production at its Oak street plant. The Oak street shops will be considerably enlarged, and when the contemplated changes are completed the molding floors will contain about 82,000 sq. ft. and the capacity of the plant in iron castings and rolls will be approximately 24,000 tons per annum. A new metal yard is being laid out, which will be served by a 25-ton traveling crane, covering 22,000 sq. ft. in area. The present foundry building at Phelps street will be converted into a machine tool shop, which will increase the floor space of the machine departments at Oak street about 20,000 square feet. The buildings, power plant, cupolas, cranes and machine tools for these improvements have all been ordered, and installation is expected to be made in August.

The Sullivan Machinery Company, Chicago, has removed its general offices from the Railway Exchange Building to a suite on the fourth floor of the new People's Gas Light and Coke Building. It is announced that Myron G. Doll from the Denver office of this company has been appointed local manager of its Salt Lake City branch, succeeding Matt Brodie, who is transferred to the department of foreign sales.

The National Stove Conventions

The Stove Founders' National Defense Association and the National Association of Stove Manufacturers held their annual conventions last week in the Hotel Astor, New York City.

The Stove Founders' National Defense Association met May 11. As the meeting was in executive session, no report of the proceedings is available. William H. Cribben, Chicago, who has been president for several years, refused a reelection. Stanhope Boal, Piqua, Ohio, was elected president, but he also declined, and this honor finally was bestowed upon George Mitchell, Pittston, Pa. The other officers elected were as follows: Vice-presidents, Frederick Will, Rochester, N. Y., and Lee W. Van Cleave, St. Louis, Mo.; treasurer, William A. Dwyer, Detroit, Mich.; secretary, Thomas J. Hogan, Chicago. The district committees remain unchanged and are as follows:

First District.—E. W. Anthony, Boston; A. W. Walker, Boston; O. G. Thomas, Taunton; J. L. Anthony, Taunton; H. A. Tinkham, Taunton.

Second District.—E. W. Peck, Rochester, N. Y.; R. G. Rennolas, Richmond, Va.; W. D. Snyder, Columbia, Pa.; J. A. Lansing, Scranton, Pa.; E. Benedict, New York, N. Y.

Third District.—Stanhope Boal, Piqua, Ohio; George H. Barbour, Detroit, Mich.; S. Kahn, Hamilton, Ohio; William A. Dwyer, Detroit; H. J. Karges, Evansville, Ind.

Fourth District.—Ralph S. Buck, St. Louis, Mo.; N. H. Burt, Leavenworth, Kan.; H. A. Viets, Milwaukee, Wis.; J. W. Emery, Quincy, Ill.; Fred Satler, Belleville, Ill.

The National Association of Stove Manufacturers held its meeting May 12 and 13. The sessions of this association were also executive. Quite a number of papers were read, among which were the following: "The Psychological Phenomena," by Charles S. Prizer, Philadelphia; "Advertising Stoves," by Frederick Will, Jr., Rochester, N. Y.; "Pattern Expense," by Franklin L. Sheppard, Philadelphia; "Systematic Ascertainment of Values *versus* Haphazard Comparisons," by Nathaniel H. Burt, Leavenworth, Kan.; "The Development of Molding Machinery and Appliances," by Abram C. Mott, Jr., Philadelphia; "The Cost of Soliciting Trade," by George Mitchell, Pittston, Pa.

Among the topics discussed were "Cost Systems," "Stove Repairs," "High-Grade Goods," "Abuses in the Sale of Stoves," "The Advisability of Establishing a Freight Bureau Within the Association," &c.

The officers of the association were reelected, as follows: President, William J. Myers, New York; vice-presidents, Abram C. Mott, Philadelphia, and Joseph W. Emery, Quincy, Ill.; treasurer, T. Darl Buckwalter, Royersford, Pa.; general secretary, Edward C. Hanrahan, Chicago, Ill.; general executive committee, Ralph S. Buck, St. Louis, Mo.; Arthur W. Walker, Boston, Mass.; Charles A. DuCharme, Detroit, Mich.; Edward Bowditch, Albany, N. Y.; Nathaniel H. Burt, Leavenworth, Kan.; Robert G. Rennolas, Richmond, Va.; John H. O'Brien, Cleveland, Ohio.

The Cement Products Exhibition Company, 150 Adams street, Chicago, announces that the Eastern Cement Show will be held in Madison Square Garden, New York, December 14 to 20, 1910, and the Western show will be held February 17 to 23, 1911, in the Coliseum, Chicago. It is stated that all contracts of importance in connection with these shows have already been placed and the intervening months will be spent in perfecting the details. More than 80 per cent. of the exhibitors at the recent Chicago show have signified their intention to exhibit at New York.

The National Association of Manufacturers

The fifteenth annual convention of the National Association of Manufacturers was held at the Waldorf-Astoria, New York, on Monday, Tuesday and Wednesday of this week. It was one of the most interesting and successful gatherings of the organization. The attendance was large, the addresses and papers were of exceptional value, and the influence of the association was undoubtedly greatly strengthened. The proceedings opened with a general feeling of sorrow over the death on the previous day of ex-President James W. Van Cleave of St. Louis, whose presence at the convention had been expected and who had served the association with marked ability and enthusiasm.

The annual report of President John Kirby, Jr., dealt with such live subjects as the influence on contemporary legislation of "class conscious labor unionism," the prevention of accidents in industrial pursuits, educational work, the corporation tax law and anti-injunction legislation.

Special committees submitted reports on Banking and Currency, Patents, Uniform State Laws, Forests and Irrigation, Interstate Commerce, Immigration and Merchant Marine. The Committee on Merchant Marine, consisting of D. A. Tompkins, H. M. Leland, W. B. Cowles, John J. Amory and S. K. Smith, held that a system of differential duties would be impracticable and recommended "sufficient postal compensation to establish a swift and regular service in American steamships to the principal countries of South America, and to the ports of Australasia, Japan, China and the Philippines."

One of the most important subjects considered by the convention was "Industrial Indemnity Insurance," on which a report of 45 printed pages with an appendix of 70 pages was submitted by a committee composed of F. C. Schwedtman, chairman; John Kirby, Jr. (ex-officio); James W. Van Cleave, D. A. Tompkins, H. E. Miles, and Henry B. Joy, with James A. Emery and A. Parker Nevin, counsel. This report reviewed conditions at home and abroad and presented the following resolutions:

1. That the present employers' liability laws are unsatisfactory, wasteful of life and money, slow in operation and antagonistic to harmonious relations between employers and wage workers.
2. That an equitable mutually contributory, indemnity system, automatically providing indemnity for victims of industrial accidents and their dependents, is required to reduce waste, litigation and friction, and to meet other requirements of an enlightened industrial nation.
3. That it is our desire to co-operate with State lawmakers in promoting sound, industrial, indemnity legislation, and our duty to oppose unsound legislation.
4. That, regardless of legislative action, we inaugurate, with the least possible delay, a system of mutual contributory industrial accident indemnity insurance, this system to be elastic enough to provide for voluntary contributory sickness, old age and death insurance if later deemed advisable.
5. That the president and directors of the National Association of Manufacturers are hereby authorized to arrange for the establishment of such a mutual contributory insurance concern, with the definite understanding that the National Association of Manufacturers assumes no financial responsibility in connection therewith.
6. That a department on prevention of industrial accidents be established by the National Association of Manufacturers, either independently or in conjunction with others, for the gathering of statistics, the study and exhibition of preventive devices, for co-operation with State and national inspection departments, and for the promotion of a better understanding of the whole subject.
7. The prevention of accidents being of the utmost importance, we authorize the president of the National Association of Manufacturers to offer annual prizes of \$10,000 for the safest plants or the best safety devices brought to his attention each year, and we urge manufacturers to offer other prizes through the medium of this association, to stimulate invention of safety devices, and a broad study of the subject, so that, in this direction, as in others, the United States may soon become the leading industrial nation of the world.

In connection with the same subject addresses were delivered by Henry L. Rosenfeld on "Co-operation

and Compensation vs. Compulsion and Compromise in Employers' Liability," and by Miles M. Dawson on "True Economy in Compensating for Industrial Accidents."

On Tuesday afternoon an especially able and interesting illustrated lecture was delivered before one of the largest gatherings in any session by Prof. Frederic Remsen Hutton, an officer of the American Museum of Safety and Sanitation, on "The Prevention of Industrial Accidents." The lantern slides exhibited covered the typical news item of an industrial accident, suggestions as to how the accident is likely to happen, the simple safeguards of common sense, and, lastly, the special safeguards of skill and experience. These latter covered safety for grinding machines, for the feeding of rolls, for pits, for transmissive machinery using belts, gears or shafting, the special dangers of drawing presses, of woodworking machinery, the quarry, the mine, the foundry, &c. The series concluded with presentations of the museums abroad and the plans of the proposed American Museum.

The Canton Sheet Steel Company

The Canton Sheet Steel Company, Canton, Ohio, recently organized with a capitalization of \$500,000, has broken ground for a new plant which will be ready for operation about October 1. The company has secured a site of 26 acres in the southwestern part of the city, which includes the plant of the Cheswick Mfg. Company. This is a building that was erected several years ago for a car manufacturing plant by the Structural Car Company, but never used by that company.

The Canton Sheet Steel Company will erect a main building, 137 x 320 ft.; a boiler house, 50 x 200 ft.; a machine shop, 50 x 100 ft., and such smaller buildings as are needed. The plant will be equipped with eight hot mills. The Cheswick plant will be used as a galvanizing department and warehouse. The company will make pickled, cold rolled, black and galvanized sheets. The plant will have an annual capacity of about 40,000 tons.

The power plant equipment will consist of five 400-hp. boilers, one 2000-hp. engine and one 200-kw. electrical unit, the latter for operating the cranes, shears and other machinery. The mills will be rope driven. There will be three cranes—one 30-ton for the mill, one 10-ton for the yard and one 10-ton for the warehouse and galvanizing plant. The machine shop will be fully equipped with such machinery as is needed. None of the contracts has as yet been placed. The company is now asking for proposals for the buildings, and will place orders for the power and other equipment shortly.

The company has effected an organization by the election of the following officers: W. W. Irwin, president; H. S. Renhert, vice-president, and C. A. Irwin, secretary, treasurer and general manager. Mr. Irwin was formerly secretary of the Berger Mfg. Company, Canton, having retired from that company on January 1. W. W. Irwin was also formerly connected with the Berger Mfg. Company.

The new plant will adjoin the tracks of the Pennsylvania & Wheeling and Lake Erie railroads, so that very satisfactory shipping facilities will be provided.

An official statement issued by the Westinghouse Electric & Mfg. Company shows that the business booked in April reached a total of \$3,000,000, not including that taken by subsidiary companies. If this was added it would increase the total to about \$3,500,000. The shipments from works have not been equal to the business booked. The company also reports that business for the first four months of 1910 is 40 per cent. greater than for the same period of 1909.

A Triplex Steel Process

Important Departure by the Dominion Iron & Steel Company, Ltd.

A noteworthy innovation in steel manufacture is being developed at the Sydney, Nova Scotia, plant of the Dominion Iron & Steel Company, and the results will be studied with great interest. The company is building two 500-ton rolling basic open hearth furnaces preparatory to operating a triplex process of steel making, or, as the company's engineers have styled it, a quadruplex process, counting separately the last reaction following the additions in the ladle after the metal is tapped from the final or third furnace. The new 500-ton furnaces are 58 ft. between ports and 21 ft. 6 in. wide. They will desiliconize direct metal from the blast furnaces, scrap and limestone additions being made here. When one of the large furnaces has been filled and the silicon has been sufficiently eliminated, the metal will be all poured out in from 16 to 18 ton heats, and blown in basic lined converters a sufficient time to dephosphorize it, from four to six minutes being required. The blown metal is then charged into a 50-ton rolling open hearth furnace, some direct metal being also added. The final recarburizing additions are made in the ladle, which is kept at a very high temperature at the time of tapping. The process contemplates that when one of the large furnaces is being emptied the other is being filled. It is considered possible by this triplex process to get 60 to 70 heats a week from a 50-ton open hearth furnace. The pig iron from the Sydney blast furnaces runs not less than 1.50 per cent. in phosphorus. The slag from the basic converters, containing about 20 per cent. phosphoric acid, finds a ready market abroad as a fertilizer at a good price. The equipment of the new open hearth furnaces includes a 75-ton double trolley ladle crane and a charging machine.

The Dominion Company is also building at Sydney a new blast furnace of the most modern type. It will be blown by exhaust turbine blowers, taking the exhaust from the present reciprocating blowing engines. This will be the fifth blast furnace, and the total capacity will be about 525,000 tons.

The present coke plant of 500 by-product ovens is being provided with the most modern appliances for handling both coal and coke. A new plant of 120 10-ton ovens is being constructed, together with a recovery system. The surplus gas from the coke plant is used for general heating purposes throughout the works. The addition will give a total of 620 by-product ovens, making the plant the largest in America.

The rolling capacity at Sydney is being increased by the erection of a new 10-in. bar and rod mill designed by the Morgan Construction Company, Worcester, Mass.

A large exhaust turbo electric power plant of the Rateau type is being installed to recover the power from the mill engine exhaust.

To meet the increased requirements of water a 15,000,000-gal. electro turbine pumping plant is being installed. The entire programme of improvement is expected to be completed within nine months, making the plant of the Dominion Iron & Steel Company one of the most modern and important in the industry.

Receiver W. Vernon Philips states that the works of the Lebanon Chain Works and the West End Iron Company, at Lebanon, Pa., subsidiaries of the Iron & Steel Products Company, Philadelphia, Pa., will be placed in operation within a few days. The Bristol Iron & Steel Company's plant at Bristol, Pa., will not be started up by the receivers, while the advisability of operating the Canton Iron & Steel Company's plant, at Baltimore, Md., has not yet been determined upon.

New Employers' Liability Law in Ohio

The Cleveland branch of the National Metal Trades Association holds lunch hour meetings once a month, at which questions of interest to the members are discussed by selected members or by invited guests. On Friday, May 13, about 50 members had luncheon together at the Gillis Hotel and afterward were addressed by Attorney J. P. Dawley of Cleveland, on some features of the new employers' liability act, which became a law in Ohio last week. The principal changes are those which relate to the fellow servant and assumption of risk principles which have obtained heretofore in the courts of Ohio. The fellow servant feature of the act is as follows, being evidently drawn with special reference to vessel and dock service:

That in all actions brought to recover from an employer for personal injuries suffered by his employee or for death resulting to such employee from such personal injuries, while in the employ of such employer, arising from the negligence of such employer or any of such employer's officers, agents or employees, it shall be held in addition to the liability now existing by law that any person in the employ of such employer, in any way having power of authority in directing or controlling any other employee of such employer, is not the fellow servant, but superior to such other employee; any person in the employ of such employer in any way having charge or control of employees in any separate branch or department shall be held to be the superior and not fellow servant of all employees in any other branch or department in which they are employed; any person in the employ of such employer whose duty it is to repair or inspect the ways, works, boats, wharves, plant, machinery, appliances or tools, in any way connected with or in any way used in the business of the employer, or to receive, give or transmit any signal, instruction or warning to or for such employees, shall be held to be the superior and not fellow servant to such other employees of such employer.

Regarding negligence the new law provides that the negligence of a fellow servant of the employee shall not be a defense, where injury or death was caused or contributed to by any defect or unsafe condition of the ways, works, boats or wharves, plant, machinery, appliances or tools, except simple tools; by the negligence of any person engaged as superintendent, manager, foreman, inspector, repair man, signal man, or in any way having charge, care or control of plant or machinery; by the negligent act of any fellow servant done in obedience to immediate or peremptory instructions given by the employer or any person having authority to direct the doing of said act; or by the want of necessary and sufficient rules for the government of employees and the operation of machinery.

In regard to assumed risk the new act provides that negligence of the employee shall not be a defense for the employer unless it was expressly made the duty of the employee to report neglect of proper safety appliances or defective or unsafe condition of machinery, &c. The law also makes all questions of negligence, contributory negligence and assumption of risk matters to be decided by the jury under the instruction of the court.

In the discussion of the matter that followed Attorney Dawley's address it was suggested that notices be posted in all shops making it the duty of each employee to report any defective or unsafe condition that may come to his attention. This matter was put in the hands of the executive committee.

The Globe Seamless Steel Tube Company.—This company, incorporated with a capital stock of \$650,000, will build a plant in Milwaukee, Wis., on a site recently purchased on Burnham street. The Worden-Allen Company, Milwaukee, has been awarded a contract to erect the first building, which will be 468 x 500 ft., one story, and is to be completed so that the equipment can be installed and be ready for operation by October 1. F. W. Renshaw is president and Lawrence Fitch vice-president and treasurer. Both were formerly connected with the Detroit Seamless Steel Tubes Company. The capacity of the plant will be 2000 tons per month of hot and cold drawn tubing.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At late, one week, one month and one year previous.

	May 18, 1910.	May 11, 1910.	Apr. 20, 1910.	May 19, 1909.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia.....	\$17.00	\$17.00	\$17.75	\$16.00
Foundry No. 2, Southern, Cincinnati.....	14.75	15.25	15.25	14.50
Foundry No. 2, local, Chicago.....	17.00	17.00	17.25	16.50
Basic, delivered, eastern Pa.....	16.50	17.00	17.50	15.00
Basic, Valley furnace.....	15.00	15.25	16.00	14.00
Bessemer, Pittsburgh.....	17.40	17.90	18.40	15.90
Gray forge, Pittsburgh.....	15.90	15.90	16.15	14.40
Lake Superior charcoal, Chicago.....	18.50	18.50	19.00	19.50

BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh.....	26.00	26.50	26.50	23.00
Forging billets, Pittsburgh.....	32.00	32.00	32.00	25.00
Open hearth billets, Philadelphia.....	29.00	29.00	30.00	24.50
Wire rods, Pittsburgh.....	32.00	32.00	32.00	29.00
Steel rails, heavy, at mill.....	28.00	28.00	28.00	28.00

OLD MATERIAL, Per Gross Ton:				
Steel rails, melting, Chicago.....	15.00	15.00	16.25	14.00
Steel rails, melting, Philadelphia.....	14.50	15.00	16.00	15.25
Iron rails, Chicago.....	17.50	17.50	18.50	16.50
Iron rails, Philadelphia.....	20.00	20.00	20.50	18.00
Car wheels, Chicago.....	15.50	16.00	16.50	14.75
Car wheels, Philadelphia.....	15.00	15.00	16.00	15.00
Heavy steel scrap, Pittsburgh.....	15.00	15.50	16.25	15.25
Heavy steel scrap, Chicago.....	13.50	13.50	14.25	13.75
Heavy steel scrap, Philadelphia.....	14.50	15.00	16.00	15.25

FINISHED IRON AND STEEL,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined iron bars, Philadelphia.....	1.50	1.50	1.50	1.40
Common iron bars, Chicago.....	1.50	1.50	1.50	1.30
Common iron bars, Pittsburgh.....	1.55	1.55	1.60	1.30
Steel bars, tidewater, New York.....	1.61	1.61	1.61	1.36
Steel bars, Pittsburgh.....	1.45	1.45	1.45	1.20
Tank plates, tidewater, New York.....	1.66	1.66	1.71	1.46
Tank plates, Pittsburgh.....	1.50	1.50	1.55	1.30
Beams, tidewater, New York.....	1.66	1.66	1.66	1.46
Beams, Pittsburgh.....	1.50	1.50	1.50	1.30
Angles, tidewater, New York.....	1.66	1.66	1.66	1.46
Angles, Pittsburgh.....	1.50	1.50	1.50	1.30
Skelp, grooved steel, Pittsburgh.....	1.50	1.50	1.50	1.30
Skelp, sheared steel, Pittsburgh.....	1.60	1.60	1.60	1.40

SHEETS, NAILS AND WIRE,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh.....	2.40	2.40	2.40	2.20
Wire nails, Pittsburgh.....	1.80	1.85	1.85	1.70
Cut nails, Pittsburgh.....	1.80	1.85	1.85	1.65
Barb wire, galv., Pittsburgh.....	2.10	2.15	2.15	2.00
METALS, Per Pound:				
Lake copper, New York.....	13.00	13.25	13.25	13.25
Electrolytic copper, New York.....	12.75	12.75	12.80	13.00
Spelter, New York.....	5.30	5.05	5.60	5.15
Spelter, St. Louis.....	5.15	4.90	5.45	5.00
Lead, New York.....	4.35	4.35	4.40	4.35
Lead, St. Louis.....	4.20	4.20	4.25	4.30
Tin, New York.....	33.20	33.25	33.05	28.00
Antimony, Hallett, New York.....	8.12½	8.12½	8.25	7.75
Nickel, New York.....	45.00	45.00	45.00	45.00
Tin plate, 100 lb., New York.....	\$3.84	\$3.84	\$3.84	\$3.64

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Structural Shapes.—I-beams and channels, 3 to 15 in., inclusive, 1.50c. to 1.55c., net; I-beams over 15 in., 1.65c., net; H-beams over 8 in., 1.75c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.60c., net; angles over 6 in., 1.65c., net; angles, 3 x 3 in. and up, less than ¼ in., 1.75c., base, half extras, steel bar card; tees, 3 in. and up, 1.65c., net; zees, 3 in. and up, 1.60c., net; angles, channels and tees, under 3 in., 1.50c., base, plus 10c., half extras, steel bar card; deck

beams and bulb angles, 1.80c., net; hand rail tees, 2.80c., net; checkered and corrugated plates, 2.80c., net.

Plates.—Tank plates, ¾ in. thick, 6¼ in. up to 100 in. wide, 1.50c. to 1.55c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼ in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edges, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼ in. to and including 3-16 in. on thinnest edge.....	\$0.10
Gauges under 3-16 in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates), 3 ft. and over in length.....	.10
Complete circles, 3 ft. diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.50
Locomotive firebox steel.....	.05
Widths over 100 in. up to 110 in., inclusive.....	.20
Widths over 110 in. up to 115 in., inclusive.....	.15
Widths over 115 in. up to 120 in., inclusive.....	.25
Widths over 120 in. up to 125 in., inclusive.....	.50
Widths over 125 in. up to 130 in., inclusive.....	1.00
Widths over 130 in. up to 140 in., inclusive.....	.25
Cutting to lengths or diameters under 3 ft., to 2 ft., inclusive.....	.50
Cutting to lengths or diameters under 2 ft., to 1 ft., inclusive.....	1.55
Cutting to lengths or diameters under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

TERMS.—Net cash 30 days.

Sheets.—Minimum prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows: Black annealed sheets, Nos. 3 to 8, 1.70c.; Nos. 9 and 10, 1.75c.; Nos. 11 and 12, 1.80c.; Nos. 13 and 14, 1.85c.; Nos. 15 and 16, 1.95c. Box annealed sheets, Nos. 17 and 21, 2.20c.; Nos. 22 to 24, 2.25c.; Nos. 25 and 26, 2.30c.; No. 27, 2.35c.; No. 28, 2.40c.; No. 29, 2.45c.; No. 30, 2.55c. Galvanized sheets, Nos. 13 and 14, 2.50c.; Nos. 15 and 16, 2.60c.; Nos. 17 to 21, 2.75c.; Nos. 22 to 24, 2.90c.; Nos. 25 and 26, 3.10c.; No. 27, 3.30c.; No. 28, 3.50c.; No. 29, 3.60c.; No. 30, 3.85c. Painted roofing sheets, No. 28, \$1.70 per square. Galvanized roofing sheets, No. 28, \$3 per square, for 2½ in. corrugations.

Wrought Pipe.—The following are the discounts on the Pittsburgh basing card on carloads of wrought pipe which went into effect January 1:

	Steel. Black. Galv.	Iron. Black. Galv.
¼ and ½ in.	70	66
¾ in.	71	67
1 in.	74	62
¾ to 6 in.	78	68
7 to 12 in.	72	57
1 to 4 in.	76	66
Extra Strong, Plain Ends.		
¼ to ¾ in.	63	51
1 to 4 in.	70	58
4½ to 8 in.	66	54
9, 10, 11 and 12 in.	54	42
Double Extra Strong, Plain Ends.		
¼ to 8 in.	59	48
9 to 12 in.	55	44

The above steel pipe discounts are for "card weight," subject to the usual variation of 5 per cent.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1½ in.	49	43
1½ to 2¼ in.	61	43
2¼ in.	63	48
2½ to 3 in.	69	55
3 to 13 in.	61	43
2½ in. and smaller, over 18 ft., 10 per cent. net extra.		
2½ in. and larger, over 22 ft., 10 per cent. net extra.		

Less than carloads to destinations east of the Mississippi River will be sold at delivered discount for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer, open hearth and chain rods, \$32.

Steel Rivets.—Structural rivets, ¾ in. and larger, 2.15c., base; cone head boiler rivets, ¾ in. and larger, 2.25c., base; ½ in. and 11-16 in. take an advance of 15c., and ¼ in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1-in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill. The above prices are absolutely minimum on contracts for large lots, makers charging the usual advances of \$2 to \$3 a ton to the small trade.

The Iron and Metal Markets

Pittsburgh

PARK BUILDING, May 18, 1910.—(By Telegraph.)

Pig Iron.—Some fairly large sales of both Bessemer and basic have been made, but at low prices. A consumer in the Wheeling district bought 5000 tons of basic for May, June and July delivery, and a sale of 5000 tons of basic was made to a large steel casting interest for delivery over the next four months, each at \$15, Valley furnace. A sale of 9000 to 10,000 tons of Bessemer was made for forward delivery at \$16.25 to \$16.50, Valley furnace. Several small lots of basic for spot shipment have been sold by dealers in the last few days at \$14.85 to \$14.90, Valley furnace, but it is doubtful if these prices could be duplicated to-day, even for small lots. The tone of the market is better and it is believed that bottom has been reached. We quote Bessemer iron at \$16.50; basic, \$15; malleable Bessemer, \$15.50; No. 2 foundry, \$15.25, and gray forge, \$15, all at Valley furnace, the freight rate to Pittsburgh being 90c. a ton.

Steel.—Inquiry for both Bessemer and open hearth billets and sheet and tin bars is fairly active. We quote Bessemer 4 x 4 in. billets at \$26 to \$26.50; Bessemer sheet bars, \$27 to \$27.50; 4 x 4 in. open hearth billets, \$28 to \$28.50; open hearth small billets, \$29 to \$29.50; open hearth sheet and tin bars, \$28.50 to \$29, and forging billets, \$32, all f.o.b. Pittsburgh, freight to destination added.

Merchant Pipe.—Some notable orders taken by the leading pipe interest from oil and gas producers during the last week or 10 days are 3000 tons of oil well casing for a large California producer; 40 miles 20-in. pipe for a gas line; 15 miles of 16-in. for a gas line; 8 miles of 16-in. for a gas line; 25 miles of 10-in. for a gas line, and 20 miles of 6-in. for an oil line.

(By Mail.)

Sentiment in the steel trade has shown a decided change for the better, and the opinion is very generally expressed that bottom has been reached in pig iron, steel, scrap and coke. For the first time in several months large consumers of iron are displaying interest in the market, and some fairly heavy sales of Bessemer and basic iron have been made in the last few days for forward delivery, but at low prices. Last week some 8000 to 9000 tons of Bessemer iron was sold here on the basis of \$16.25 at Valley furnace, but it is doubtful whether this price could be duplicated to-day. It is also a fact that last week several small lots of basic iron were sold at \$14.85 and \$14.90, Valley furnace, and, while this might be done again on small lots for prompt shipment, the market for forward delivery is fairly firm at \$15, Valley furnace, and several 5000-ton lots have been sold for delivery over the next three or four months at this price. It is absolutely certain that merchant furnaces paying the new prices for ore cannot make a profit on basic iron at \$15 and Bessemer at \$16.25. If the ore producers insist on enforcing the advance of 50c. a ton on ore, some of the merchant furnaces will have to stay shut down, as they cannot possibly get out whole with iron selling at these prices. Curtailment in the output of pig iron is still going on, the Carnegie Steel Company's furnace at Niles, Ohio, having blown out on Saturday, while the Ohio Iron & Steel Company's furnace at Lowellville will go out this week, and other Valley furnaces are getting ready to shut down. There is a better inquiry for steel. The market on finished iron and steel shows no material change, but specifications on some lines, notably wire products, are coming in a little better. Two or three very large projects for gas lines are up, and if these go through they will require a very large tonnage of pipe. The old material market has shown a further decline, heavy steel scrap having sold at \$15, Pittsburgh, the lowest price reached for some months.

Ferromanganese.—There has been a more active inquiry in the last few days and several lots of foreign 80 per cent. have been sold at \$40.50, Baltimore, or \$42.45, Pittsburgh.

Ferrosilicon.—Very little new inquiry is reported, most consumers being fully covered for some time ahead. Prices are fairly strong. We quote 50 per cent. at \$59 to \$59.50, Pittsburgh; 10 per cent., \$23.90; 11 per cent., \$24.90, and 12 per cent., \$25.90, all f.o.b. Pittsburgh.

Muck Bar.—In the absence of any sales in this market for a long time, we make nominal quotations of \$28.50 to \$29 for best grades of muck bar, made from all pig iron, f.o.b. cars, Pittsburgh.

Rods.—Most consumers being covered by contracts placed some time ago, new inquiry is light. We quote Bessemer, open hearth and chain rods at \$32 to \$33, Pittsburgh. A number of large consumers of rods have contracts placed some time ago at \$31 and less, on which they are still specifying.

Skelp.—Some fair sized tonnage has recently been placed on grooved and sheared iron plates. For ordinary widths and gauges we quote grooved steel skelp at 1.50c. to 1.55c.; sheared steel skelp, 1.60c. to 1.65c.; grooved iron skelp,

1.80c., and sheared iron skelp, 1.90c., all f.o.b. mill, Pittsburgh.

Steel Rails.—An active inquiry for light rails is coming from the lumber interests in the South and from coal mine operators. In the past week the Carnegie Steel Company entered new orders for about 3100 tons of light rails and received specifications against old contracts for about 1000 tons. The company also received numerous small orders for standard sections of rails and some nice orders for splice bars, one contract calling for 44,000 pairs of splice bars, with reinforced joints. The three Edgar Thomson rail mills at Bessemer are running to about 50 per cent. or more of capacity, with specifications for 60 days. We quote steel axles at 1.75c. to 1.80c. and splice bars, 1.50c., at mill, Pittsburgh. Light rail prices are as follows: 8 to 10 lb., \$32; 12 to 14 lb., \$29; 16, 20 and 25 lb., \$28; 30 and 35 lb., \$27.75, and 40 to 45 lb., \$27, Pittsburgh. These prices are for 250-ton lots and over, and for small lots premiums of 50c. per ton and more are being paid. We quote standard sections at \$28, at mill.

Structural Material.—A little more inquiry has developed, but it is evident that a good deal of large work is being held back. The McClintic-Marshall Construction Company has taken a bridge for the Cincinnati, Hamilton & Dayton at Hamilton, Ohio, requiring 1500 tons. This will be a unique structure in the fact that it will have six 100-ft., double track, plate girder spans. The Penn Bridge Company, Beaver Falls, has taken about 400 tons for new buildings for the Standard Gauge Steel Company and the American Bridge Company has closed for close to 4000 tons of bridge work for Western roads. Complaint is still heard that very low prices are being made on fabricated work, said in some cases to be below actual cost. We quote beams and channels up to 15-in. at 1.50c., f.o.b., Pittsburgh, and the market is firm at this price for large lots.

Plates.—The long expected orders for steel cars from the Harriman Lines have finally been placed. In addition to the orders given to the American Car & Foundry Company and Cambria Steel Company, the Standard Steel Car Company secured about 2000 cars. The Union Railroad has placed orders for 500 steel gondolas with the American Car & Foundry Company and 500 with the Standard Steel Car Company. The Pressed Steel Car Company has received an order for 50 hopper ore cars from the Nevada Copper Belt Railway, and the St. Louis & San Francisco has bought 250 automobile cars from the Standard Steel Car Company and 500 from the American Car & Foundry Company. Inquiries now in the market include 1000 steel hopper cars for the Grand Trunk, 1000 ore cars for the American Smelting & Refining Company and 250 box cars for the Carolina, Clinchfield & Ohio Railroad. Local mills are not much interested in the inquiry for 25,000 to 30,000 tons of plates for the lock gates at Panama, as the price named is 1.50c., delivered, Colon. This would figure out 1.25c., Pittsburgh, or lower, which is not attractive. We quote 1/4-in. and heavier plates at 1.50c., Pittsburgh, in large lots. It is stated that in some cases, and to meet certain competition, 1.45c. has been done.

Sheets.—A continued active demand is experienced for plain and corrugated roofing sheets, while there is also more inquiry for black and galvanized sheets. It should be noted that any concessions being offered in prices of sheets are only on orders for prompt shipment, the few mills making these concessions refusing to take contracts for delivery ahead. The leading mills are pretty well filled up on black and galvanized sheets for the next three or four months, and in most cases are not meeting the concessions, which amount to about \$2 a ton on black and \$3 on galvanized. Slight premiums are still being paid on prompt shipments on blue annealed and electrical sheets, which are in heavy demand. Regular prices on black, galvanized and roofing sheets will be found on a previous page.

Tin Plate.—This is about the most active item in the whole list of finished iron and steel, all the leading mills being well filled up into the third quarter. Some heavy contracts for bright plate from can manufacturers have been entered for delivery in the last quarter. On Monday, May 16, the Jones & Laughlin Steel Company became a producer of tin plate, having started six mills at Aliquippa. The other six mills in this first unit will be started in a few days. Prices of tin plate are firm, and we quote 100-lb. cokes at \$3.60 per base box, f.o.b. Pittsburgh.

Bars.—Specifications against contracts for steel bars and also new orders are coming in freely, and this has the effect of causing the mills to maintain a very firm attitude in regard to prices. Some fair orders for iron bars are being placed; the mills are fairly busy, but could take care of more tonnage. We quote steel bars at 1.45c. and iron bars at 1.55c., f.o.b. Pittsburgh, in large lots.

Hoops and Bands.—Mills report specifications against contracts coming in at a fairly satisfactory rate, while new orders are a little more plentiful. We quote steel hoops for

The Iron and Metal Markets

forward delivery at 1.50c. to 1.60c., while for prompt shipment as high as 1.65c. is obtainable. Steel bands are 1.40c. to 1.50c. on contracts for forward delivery and 1.60c. to 1.65c. for reasonably prompt shipment, these carrying steel bar card extras.

Spelter.—The market has shown some improvement in demand and prices are higher. We quote prime grades of Western for May and June delivery at 5.15c., East St. Louis, equal to 5.27½c., Pittsburgh.

Spikes.—The demand for railroad spikes continues dull, being altogether for small lots for repair work. Makers of boat spikes and small railroad spikes are entering some good orders. We quote standard sizes of railroad spikes, 4½ x 9-16 in. and larger, at \$1.60 to \$1.65 for Western shipment and \$1.65 to \$1.70 for local trade. Boat and small railroad spikes are firm, at \$1.75, base, these prices being for carloads and larger lots.

Shafting.—This is one of the most active items in the whole list, the new demand being quite heavy, while specifications against contracts are coming in at a faster rate than the mills can take care of. All the makers of shafting are now somewhat behind in shipments on orders. Regular discounts on shafting are 55 per cent. off in carloads and 50 per cent. in less than carloads, and it is stated that they are being absolutely maintained.

Wire Products.—The new demand for wire nails and wire has shown some increase, and mills also report that specifications against contracts are coming in a little more freely. Stocks of wire nails and wire held by jobbers are now believed to be moving out more freely than for some time. Concessions on prices on wire products do not in most cases amount to more than \$1 a ton. We quote wire nails at \$1.80 to \$1.85 in carloads and larger lots; galvanized barb wire at \$2.10 to \$2.15; painted at \$1.80 to \$1.85; annealed fence wire, \$1.60 to \$1.65; galvanized, \$1.90 to \$1.95, and cut nails, \$1.80, all f.o.b. cars Pittsburgh, usual terms, full freight to destination added.

Merchant Pipe.—The Arkansas Natural Gas Company has been figuring on a line of 200 miles of 12 to 18-in. pipe for a long time, but it may be a good while until the line is actually placed. The Ohio Fuel Supply Company is actively inquiring for 10 miles of 10-in. and will probably want 50 to 60 miles of 20-in. pipe in the near future. It is also likely that the Everett-Busch Syndicate at St. Louis will want a large tonnage of line pipe in the near future, if its present plans are carried out. The leading pipe mills are fairly busy on lap weld sizes, but in butt weld they are not doing so well. Prices on steel pipe are firm, and it is believed the reduction of one point, or \$2 a ton, made on iron pipe by several of the local mills last week will do much to eliminate the cutting in prices of iron pipe which has been going on for some time. Several of the leading iron pipe mills did not issue new cards, but are meeting the reduction. Regular discounts on both iron and steel pipe now in effect are printed on a previous page in this issue.

Boiler Tubes.—There is no improvement in demand for either locomotive or merchant tubes, which is only fair and confined mostly to small lots. Several good sized inquiries for locomotive tubes are in the market and will likely be placed shortly.

Iron and Steel Scrap.—Prices have shown a further decline in the past week, but it is now believed that the bottom of the market has been reached. A good many short sales of scrap have been made, which dealers are now trying to cover in the fear that the market may show a sudden advance. A good deal of bundled sheet scrap is pressing the market to find sale, and prices on it have gone off sharply. Dealers quote about as follows, per gross ton, for delivery at Pittsburgh or elsewhere, as noted:

Heavy steel scrap, Steubenville, Folsom, Sharon, Monessen and Pittsburgh delivery.....	\$15.00 to \$15.25
No. 1 foundry cast.....	15.50 to 15.75
No. 2 foundry cast.....	13.50 to 14.00
Bundled sheet scrap, at point of shipment.....	11.50 to 11.75
Re-rolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.....	17.00
No. 1 railroad malleable scrap.....	15.00 to 15.25
Grate bars.....	10.00 to 10.25
Low phosphorus melting stock.....	19.50 to 20.00
Iron car axles.....	26.00 to 26.25
Steel car axles.....	21.00 to 21.25
Locomotive axles.....	25.50 to 26.00
No. 1 bushing scrap.....	13.75 to 14.00
No. 2 bushing scrap.....	9.00 to 9.25
Old car wheels.....	14.50 to 15.00
Sheet bar crop ends.....	16.00 to 16.50
Cast iron borings.....	8.00 to 8.25
Machine shop turnings.....	9.50 to 9.75

Coke.—Last week showed an increase in the output of coke of about 22,000 tons over the previous week, but it is believed that this week will show a falling off, as the producers are steadily blowing out ovens. The very low prices ruling for furnace and foundry coke are attractive to con-

sumers, and some large contracts for furnace coke have been made. We note one contract for 5000 tons per month for second half of the year at \$1.75; 9000 tons a month for same delivery at \$1.80, and 12,000 tons a month, July to December, at \$1.80, all per net ton at oven, and for coke running under 1 per cent. in sulphur. There is a little more inquiry for foundry coke and prices on best grades run from \$2.25 up to \$2.40 per net ton, at oven, to consumers. We quote standard grades of furnace coke running under 1 per cent. in sulphur at \$1.70 to \$1.75, at oven, for spot shipment, and \$1.80 to \$1.85, at oven, for last half of the year delivery.

Chicago

FISHER BUILDING, May 18, 1910.—(By Telegraph.)

The agricultural implement manufacturers have placed contracts covering their steel bar requirements for the coming year. This business amounts to about 150,000 tons, not including any harvesting machine business, which is now supplied by the mill controlled by the leading interest in that line. The steel mills have maintained their price of 1.45c., Pittsburgh, for soft steel bars. It is understood, however, that about one-third of the tonnage represented by these contracts consists of hard steel bars, on which a price has been made to meet the competition of rail stock mills. On hard steel bars from rail stock any buyer of a considerable tonnage could do about 15c. per 100 lb. less in this market than the Chicago price of soft steel bars, so the only concession is in placing hard billet stock in competition with rail stock bars. There is a good demand from the concrete trade for hard steel bars at 1.55c. to 1.60c. Chicago bar iron is a little weaker on account of the decline in scrap, but the mills are reluctant to make concessions. The fabricating interests report signs of returning confidence among investors who have projects pending for new buildings. A fair tonnage of this business was closed the past week, following a good run of contracts the week before. In addition to the items reported by mail in this correspondence it is understood that the Big Four Railroad has let to the McClintic-Marshall Construction Company the contract for its Beach Grove shops, near Indianapolis, which will require about 6000 tons. The railroads have a large amount of bridge business pending, but have not yet offered prices which the fabricating interests consider in line with market conditions. The contract of the Harriman lines for 12,440 steel cars is the largest car order placed this year, and is another indication of returning confidence among large patrons of the steel industry. All the cars in this order are to have steel underframes, except 65 caboose cars. There are 5750 box cars, 1000 automobile cars, 1800 stock cars, 1200 ballast cars, 1325 flat cars, 750 tight gondolas, 400 drop gondolas and 150 hopper cars. The American Car & Foundry Company booked about 10,000 cars of this order. The scrap market is steady this week and a fair business is being done in metals. Several hundred manufacturers and representatives of shipping interests are in attendance at a conference at the Congress Hotel to protest against the general advance in freight rates.

Pig Iron.—An unusual attitude of indifference prevails in the Chicago market. Neither the Northern nor Southern furnace interests disclose any desire to sell iron for forward delivery at present prices and buyers are equally indifferent. A fair amount of business is being done in small lots for prompt shipment, which foundries are buying to even up their mixtures or maintain small stocks on their yards. The iron men universally confirm the opinion expressed in this report last week that foundries are not covered more than two or three months ahead at an average, including iron bought as well as stocks at foundries. There is not so much talk of iron being offered below \$12, Birmingham, the only lower prices which can be confirmed being on analysis iron. There is good inquiry for small lots of high silicon iron of Jackson County grades as well as Southern high silicon, and there are also sales of small lots of low phosphorus and other special grades. A recent inquiry for 6000 tons of low phosphorus for a new steel foundry has been withdrawn for the present and the report that a local steel interest has been in the market for 8000 tons of Northern basic is not confirmed. Northern iron for Chicago delivery is now quoted at practically book cost. Allowing for selling expenses and shipping charges, the current price is very little above cost on last year's ore and is below cost on 1910 ore, so that any sales for last half at current prices would represent a sacrifice of profits on ore and other materials. This undoubtedly explains the indifferent attitude of the furnace interests regarding forward sales on Northern iron. The Southern furnace interests believe it is immaterial whether they sell now or wait until foundries have used up their stocks and will be compelled to buy, as business is generally good in the West and the iron will be used anyway. Leading Southern interests are confident that the demand will be equal to the capacity of the furnaces which can afford to sell at \$12, Bir-

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mingham. The only check in consumption that is generally recognized in the West is in the malleable foundries which have completed their agricultural contracts and have not booked much railroad business recently. The following quotations are for May and June shipment, Chicago delivery:

Lake Superior charcoal.....	\$18.50 to \$19.00
Northern coke foundry, No. 1.....	17.50 to 18.00
Northern coke foundry, No. 2.....	17.00 to 17.50
Northern coke foundry, No. 3.....	16.50 to 17.00
Northern Scotch, No. 1.....	18.00 to 18.50
Southern coke, No. 1.....	16.60 to 17.10
Southern coke, No. 2.....	16.35 to 16.85
Southern coke, No. 3.....	16.10 to 16.60
Southern coke, No. 4.....	15.85 to 16.35
Southern coke, No. 1 soft.....	16.60 to 17.10
Southern coke, No. 2 soft.....	16.35 to 16.85
Southern gray forge.....	15.60 to 16.10
Southern mottled.....	15.35 to 15.85
Malleable Bessemer.....	17.00 to 17.50
Standard Bessemer.....	19.40 to 19.90
Jackson Co. and Kentucky silvery, 6%.....	19.90 to 20.40
Jackson Co. and Kentucky silvery, 8%.....	20.90 to 21.40
Jackson Co. and Kentucky silvery, 10%.....	21.90 to 22.40

(By Mail.)

Billets.—No supplies have been offered in this market as yet by the local mills. Quotations from Eastern mills are reported lower, especially on Bessemer billets.

Rails and Track Supplies.—Good orders are appearing in the Chicago market for track fastenings, to go with new rails that were bought last fall and winter. The demand is also unusually good for light rails. We quote standard railroad spikes at 1.80c. to 1.90c., base; track bolts with square nuts, 2.50c. to 2.60c., base, all in carloads, Chicago. Light rails, 40 to 45 lb., \$27; 30 to 35 lb., \$27.75; 16, 20 and 25 lb., \$28; 12 lb., \$29, Chicago.

Structural Material.—The Karpen Building in Chicago, on the lake front at Michigan avenue and Harmon court, which will require 5700 tons of material, has been let to the South Halsted Street Iron Works. The mill material will be furnished by the Lackawanna Steel Company. The exhibition building at Los Angeles, Cal., 300 tons, was let to the Union Iron Works. A courthouse at Georgetown, Texas, 236 tons, went to the Memphis Bridge Company. The American Bridge Company booked 500 tons of car axles last week, following a similar order of 1000 tons the week before. The Heisen Building in Chicago, mentioned last week in this report, will require 4500 tons of steel. Many important projects are on the point of being let and there are indications that the fabricators will book a large amount of business in the near future. Railroad bridge orders form a very important feature of the business pending. The fabricators have been making low prices recently, but the concessions do not appear as yet to have extended to the open market for plain material. We quote plain material from mill 1.68c. to 1.73c., Chicago; from store, 2c., Chicago.

Plates.—The order of the Harriman Lines for 12,000 steel cars comes just in time to help out the bookings of the plate mills. This order will require from 100,000 to 150,000 tons of car plates and shapes, and reaches one of the weak spots in the market. It is understood that the car contract was taken on very close figures. We quote mill prices at 1.68c. to 1.73c., Chicago; store prices, 2c., Chicago.

Sheets.—There is a fair amount of new sheet business and not much is heard in this market of concessions reported from Eastern mills. It is believed that these concessions are only available on very desirable orders. We quote as follows, Chicago: No. 10 annealed, 1.93c.; No. 28 black, 2.58c.; No. 28 galvanized, 3.68c. Prices from store, Chicago, are: No. 10 blue annealed, 2.25c. to 2.35c.; No. 28 black, 2.90c. to 3c.; No. 28 galvanized, 4c. to 4.10c.

Bars.—It is currently reported in the Chicago market that the plow manufacturers have quietly placed the greater part of their bar business within the past week or two. While the soft steel bars have been contracted on the basis of 1.45c., Pittsburgh, it is understood that the mills which have booked the soft steel business have also taken a large tonnage of hard steel bars at a concession in price which has proved satisfactory to the agricultural people. The open market in Chicago for hard steel bars from rail stock is 1.50c., and it is understood that on attractive orders, such as the plow men could give, some of the rail stock mills would do 15c. per 100 lb. less than the lowest price on soft steel bars. If one-third of the agricultural bar business is for hard steel bars at the present market, the contracts would average up on a basis of 1.40c., Pittsburgh. There is a fair amount of new business for this season of the year from miscellaneous sources. On bar iron some of the mills are holding 1.50c. as the minimum to protect the business on their books, but it is understood that in some cases the buyer could obtain concessions from this price on attractive business for early delivery. Subject to the usual delay in delivery of soft steel bars, we quote as follows: Soft steel bars, 1.63c. to 1.68c.; bar iron, 1.50c. to 1.55c.; hard steel bars rolled from old rails, 1.50c. to 1.55c., all Chicago.

Rods and Wire.—The trade continues on a very satis-

factory basis from the standpoint of the mills. Jobbers are placing a good volume of new business and specifications indicate that stocks are going into consumption at a normal rate. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.83c.; wire nails, 2.03c.; painted barb wire, 2.03c.; galvanized, 2.33c., all Chicago.

Merchant Steel.—The demand from store for all lines of merchant mill products continues very active. There are not so many large orders from manufacturers in distress as there were a few months ago, but there is still a great deal of business of this character from manufacturers of agricultural implements, automobiles and other products. The agricultural people are placing their contracts for their special materials for the coming year. A short time ago it was not uncommon for a single automobile or agricultural concern to order 100 tons a week from store, on account of disappointment in deliveries from the mills.

Cast Iron Pipe.—There were no large municipal lettings last week in the West, but there was a fair run of small lettings and orders from municipalities. Some business was booked from the gas companies and good orders were also received from the railroads for culvert pipe. On current business we quote, per net ton, Chicago, as follows: Water pipe, 4-in., \$28.50; 6 to 12 in., \$27.50; 16-in. and up, \$26.50, with \$1 extra for gas pipe.

Old Material.—The rapid declines during the past month have brought scrap values to a level where supply and demand seem to be adjusting themselves on an even basis. Re-rolling rails are holding steady and there is a fair local demand for melting steel at prices around \$13.50, delivered, at mill, although some dealers report difficulty in realizing this price, as the local mills are not free buyers. Some relief has been felt in this market for steel scrap by the action of the Eastern railroads in raising embargos which they had put on mills in the Pittsburgh district. Car axles are steadier and the rolling mills are taking wrought scrap more freely at present prices, which reduces the average cost of material on their yards in proportion to the amount of material they buy now. Cast scrap is in fair demand and shows no further decline, but railroad malleable is weaker. The malleable foundries have finished their agricultural season and new business from railroads is not coming as freely as expected. It is understood that the Illinois Central did not sell the car wheels it offered last week, and no other sales of any moment are reported, but the price is quoted 50c. lower this week. Following prices are per gross ton, delivered, Chicago:

Old iron rails.....	\$17.50 to \$18.00
Old steel rails, re-rolling.....	17.00 to 17.50
Old steel rails, less than 3 ft.....	15.00 to 15.50
Relaying rails, standard sections, subject to inspection.....	24.00 to 25.00
Old car wheels.....	15.50 to 16.00
Heavy melting steel scrap.....	13.50 to 14.00
Frogs, switches and guards, cut apart.....	13.50 to 14.00
Shoveling steel.....	13.00 to 13.50

The following quotations are per net ton:

Iron angles and splice bars.....	\$15.00 to \$15.50
Iron car axles.....	20.00 to 20.50
Steel car axles.....	20.00 to 20.50
No. 1 railroad wrought.....	12.75 to 13.25
No. 2 railroad wrought.....	11.75 to 12.25
Springs, knuckles and couplers.....	12.50 to 13.00
Locomotive tires, smooth.....	17.50 to 18.00
No. 1 dealers' forge.....	11.00 to 11.50
Steel axle turnings.....	9.50 to 10.00
Machine shop turnings.....	8.00 to 8.50
Cast and mixed borings.....	5.50 to 6.00
No. 1 bushing.....	10.50 to 11.00
No. 2 bushing.....	8.00 to 8.50
No. 1 boilers, cut to sheets and rings.....	9.50 to 10.00
No. 1 cast scrap.....	13.00 to 13.50
Stove plate and light cast scrap.....	11.00 to 11.50
Railroad malleable.....	12.50 to 13.00
Agricultural malleable.....	11.50 to 12.00
Pipes and flues.....	9.50 to 10.00

Metals.—There is a fair amount of jobbing business in copper in the Chicago market and buyers show a disposition to cover their requirements a little farther ahead at present prices, some desirable business having been done for June and July shipment. On lake copper large buyers whose business is especially desirable have been able to do 12½c., but the usual quotation is 12¼c. Tin continues to fluctuate within a narrow range, which does not make much variation in the Chicago price. The spelter market is very dull in the casual demand which comes through the jobbing trade, but the inside price quoted to large consumers has advanced nearly ¼c. in the past 10 days. We quote Chicago prices as follows: Casting copper, 12½c.; lake, 13¼c. to 13½c., in carloads, for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, car lots, 33¼c.; small lots, 35c.; lead, desilverized, 4.25c. to 4.30c., for 50-ton lots; corroding, 4.50c. to 4.55c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.30c. to 5.35c.; Cookson's antimony, 10½c., and other grades, 9¼c. to 10¼c.; sheet zinc is \$7.50, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote: Copper wire, crucible shapes, 13c.; copper bottoms, 11c.; copper clips, 12¼c.; red brass, 12¼c.; yellow brass, 9¼c.;

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light brass, 7c.; lead pipe, 4½c.; zinc, 4½c.; pewter, No. 1, 24c.; tin foil, 26c.; block tin pipe, 30c.

The Chicago offices of the Republic Iron & Steel Company, Walter-Wallingford & Co., and the Pennsylvania and Maryland Steel Companies have been removed to the new McCormick Building on the lake front, Michigan avenue and Van Buren street.

Philadelphia

PHILADELPHIA, PA., May 17, 1910.

The decreased rate of pig iron production has apparently checked further declines in prices; consumers are striving to force a lower level, but without material success. Further curtailment in the output in this territory is to be noted; the Andover furnace has gone out and another Wharton stack will soon be blown out. No. 1 Warwick will go out for repairs next week, to remain out probably six weeks. The new Worth furnace was blown in May 10 to run on basic iron for the company's own consumption. More business has been placed in some grades of finished materials, good sized orders for boat plates have been closed and a better demand for structural materials is evident, particularly for buildings. Finished material prices, as a rule, appear a shade firmer. Billets have not been in very good demand, but sheets have been quite active. Refined iron bars are dull. Little movement is reported in old material; prices in the principal grades show further recession. Eastern shipyards, which have recently taken orders for several vessels, are beginning to place orders for materials.

Pig Iron.—A better volume of business has been transacted in the foundry grades; certain buyers, believing the market has about reached the bottom, have placed orders for lots of from 100 to 500 tons, mainly for delivery in the third quarter. There has also been a little more buying in small lots for prompt shipment. A decidedly better volume of inquiries is to be noted, particularly for No. 2 X and No. 2 plain foundry iron. Several melters are testing the market for lots of 1000 and 2000 tons for third quarter and more extended delivery, while some who withdrew from the market a month or more ago are again making inquiries. Sellers are not pressing for business at present prices, believing that the effect of the curtailment in production will bring a turn for the better. Quotations on practically all grades show a narrower spread, those for eastern Pennsylvania No. 2 X foundry ranging from \$17 to \$17.25, delivered, for either prompt or third-quarter shipment, while the outside figure could no doubt be done for second half. The tendency to cut the usual differential between No. 2 X and No. 2 plain from 50 to 25 cents is more pronounced, particularly in Northern brands. Small sales of Southern No. 2 foundry at \$12, Birmingham, basis are reported, and quite an active movement in Virginia foundry iron for delivery during the next three months, at a \$14.25, furnace, basis for No. 2 X foundry. Cast iron pipe makers are still in the market for low grade iron, but sales have been less extensive the past week. A sale of several thousand tons to an Eastern pipe works has been reported, while further tonnages have been taken by Virginia pipe makers. There has been no movement in forge iron; recent inquiries by mills have not developed into orders. The basic iron situation is unchanged; consumers show no interest in the market and less iron of this grade is being offered. Quotations of \$16.50 to \$16.75, for prompt and third quarter delivery, do not appear to interest consumers. Low phosphorus iron has been more active; sales aggregating upward of 800 tons are reported for delivery both in this territory and the West. Prices for this grade are firm and unchanged. Quotations for standard brands, delivered in buyers' yards in this territory, prompt or third-quarter shipment, range about as follows:

Eastern Pennsylvania, No. 2 X foundry	\$17.00 to \$17.25
Eastern Pennsylvania, No. 2 plain	16.50 to 17.00
Virginia, No. 2 X foundry	17.25 to 17.50
Virginia, No. 2 plain	17.00 to 17.25
Gray forge	16.00 to 16.50
Basic	16.50 to 16.75
Standard low phosphorus	23.00 to 23.25

Ferromanganese.—In addition to the sale made to a central Pennsylvania consumer, reported last week, a further sale to the same buyer bringing the total to 5000 tons, for last half and early 1911 delivery, is reported. The price, it is understood, is under \$40.50, Baltimore. Local demand is at a standstill and the market is not very strong.

Billets.—The demand for forging billets for third quarter delivery has been more active, and sales are reported at \$32, Eastern mill. Rolling billets are in better supply, owing to less active demand. Prices for open hearth billets range from \$29 to \$30, delivered in this vicinity. Mills keep fully engaged, specifications on contracts coming out quite freely.

Plates.—A larger amount of business has been closed,

particularly in boat plates, for which orders aggregating 10,000 to 12,000 tons have been placed by Eastern shipyards. Bridge and building material business is better and some good car orders are in sight. There has been a greater volume of general business and specifications are heavier. Eastern mills are better engaged, and a more favorable view is taken of the situation. Prices are firmer, at 1.70c. to 1.75c. for ordinary plates, delivered in buyers' yards in this vicinity.

Structural Material.—Building work shows increasing activity. Several moderate contracts have been closed in this territory. The Fairmount Hotel, before the trade some months ago, is again up and it is now said will result in business. A 500-ton contract for a car barn in Washington, D. C., has been awarded a Baltimore fabricator, and bids for an addition to the Emerson Building in the latter city, requiring about 1500 tons, were opened last week. Bids for a small steel girder bridge for the city of Reading will be opened in a few days. Several other moderate sized propositions are before the trade, while the usual run of miscellaneous business holds up well. Open quotations for plain structural shapes range from 1.65c. to 1.70c., delivered in this territory, although it is understood that the inside figure can be shaded for desirable business.

Sheets.—There has been no diminution in the activity or urgency in the demand. Specifications come out freely, and mills in this territory find it difficult to keep up with consumers' requirements in deliveries. Prices are firm and for reasonably early deliveries range as follows: Nos. 18 to 20, 2.80c.; Nos. 22 to 24, 2.90c.; Nos. 25 and 26, 3c.; No. 27, 3.10c.; No. 28, 3.20c.

Bars.—The demand is a shade better. Some mills are more actively engaged since taking business previously placed with the Iron & Steel Products Company, which the latter has been unable to handle owing to its recent financial difficulties. Prices for refined iron bars are a trifle firmer at 1.50c. to 1.55c., delivered in this territory. Steel bars are hard to get for prompt delivery, but for extended shipment can be had at 1.60c., delivered.

Coke.—Further sales of furnace coke for second half delivery are reported; one transaction covered 12,000 tons for New Jersey delivery, and another 9000 tons for a nearby furnace, at \$1.85, at ovens. Small sales of foundry coke at prices ranging from \$2.25 to \$2.50, at ovens, have been made, although a few sellers still hold this grade at \$2.75, ovens. Very little forward business has been done in foundry coke. For deliveries in buyers' yards in this vicinity the following range of prices per net ton is named:

Connellsville furnace coke	\$3.90 to \$4.10
Foundry coke	4.50 to 4.75
Mountain furnace coke	3.50 to 3.70
Foundry coke	4.10 to 4.35

Old Material.—Prices continue to move downward, owing largely to lack of demand and steadily increasing stock of some grades. Heavy melting steel is now quoted at \$14.50, delivered, and has been bought in moderate tonnages by the leading consumers. The various special grades are at a standstill, with quotations entirely nominal. Borings and turnings are probably the weakest on the list. The market is dull and transactions in most instances insufficient to establish quotations. The following range about represents the market for deliveries in buyers' yards in this vicinity:

No. 1 steel scrap and crops	\$14.50 to \$15.00
Old steel rails, rerolling	17.00 to 17.25
Low phosphorus	20.50 to 21.00
Old steel axles	20.50 to 21.50
Old iron axles	23.50 to 27.50
Old iron rails	20.00 to 20.50
Old car wheels	15.00 to 15.50
No. 1 railroad wrought	17.00 to 17.50
Wrought iron pipe	15.00 to 15.50
No. 1 forge fire	13.00 to 13.50
No. 2 light iron	8.50 to 9.00
Wrought turnings	9.50 to 10.00
Cast borings	8.50 to 9.00
Machinery cast	15.00 to 15.50
Railroad malleable	14.50 to 15.00
Grate bars	12.50 to 13.00
Stove plate	10.00 to 10.50

The continuation of the arrangement among a number of eastern Pennsylvania steel companies for buying scrap material was decided upon at a recent meeting of officials of the various companies. One interest which recently withdrew is understood to have re-entered the arrangement.

S. S. McCormick, president of the C. C. Knight Company, iron and steel merchants, Sixteenth and Callowhill streets, denies most emphatically reports current in the trade that the company is going out of business, stating that it will be continued as heretofore at the same location.

The first of the two new blast furnaces of the Worth Brothers Company, Coatesville, Pa., was blown in May 10.

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Cincinnati

CINCINNATI, OHIO, May 18, 1910.

Foundries are not so active as during April. There is some buying of pig iron in central territory and of foundry irons mostly, Northern furnaces being most aggressive this week. Old material is weaker, and there is little life in the coke market.

Pig Iron.—Fierce competition has developed among Ohio furnacemen for some 3000 or 4000 tons of foundry iron needed by melters in this immediate vicinity. As a result of this competition a new price must be recorded for Ohio irons; it is possible to do \$15, Ironton, for No. 2 over the next four or five months, but \$15.50 is the universal asking price, and even \$16 is asked by one interest. At least three large foundry interests in a large southern Ohio manufacturing community have bought tonnages ranging from 500 to 1200 tons in the past five days for delivery over the last half. One large consumer bought 350 tons Northern No. 2 and 150 of No. 3 for last half delivery at about \$16.15, delivered, for No. 2. Another in the same vicinity bought about 1200 tons Southern iron at about \$11.50 for No. 2. On the other hand, a large agency declares it is unable to place an order of 3000 tons on a basis of \$11.25, Birmingham, for No. 3, and \$11 for No. 4. A large Southern buyer is reported to have agreed to consider within a limited time offers of certain tonnages for delivery over last half based on \$11.50, Birmingham, for No. 2. An Ohio user of malleable is willing to consider offers on 500 ton shipments to begin in June. An Indiana manufacturer is seeking 500 tons Northern No. 1, 0.75 per cent. silicon and over, and the same amount of Southern No. 2, 0.25 per cent. silicon and over, for last half. Several foundrymen in this market are reported willing to take on some iron if \$11 for Alabama and \$15 or better on southern Ohio can be done. Charcoal irons are quotable at about \$22 to \$23, Birmingham, and a little inquiry is accumulating from car wheel manufacturers. Nothing is heard of the high silicons. Low grades seem to be very scarce and agencies are unwilling to quote a definite price. Authorities in both Eastern and Birmingham districts affect to see evidence of betterment in conditions and possibilities of an early advance, but in the meantime development of such close competition among southern Ohio interests is tending to seriously disturb the larger producers, whose ores are purchased at the higher last half price. For immediate delivery and over the next four or five months, based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote f.o.b. Cincinnati as follows:

Southern coke, No. 1 foundry.....	\$15.25 to \$15.75
Southern coke, No. 2 foundry.....	14.75 to 15.25
Southern coke, No. 3 foundry.....	14.25 to 14.75
Southern coke, No. 4 foundry.....	14.25
Southern coke, No. 1 soft.....	15.25 to 15.75
Southern coke, No. 2 soft.....	14.75 to 15.25
Southern gray forge.....	14.00 to 14.25
Ohio silvery, 8 per cent. silicon.....	19.70
Lake Superior coke, No. 1.....	16.70 to 17.20
Lake Superior coke, No. 2.....	16.20 to 16.70
Lake Superior coke, No. 3.....	15.70 to 16.20
Standard Southern car wheel.....	25.25 to 25.75
Lake Superior car wheel.....	22.25 to 22.75

(By Mail.)

Coke.—Foundry coke is dull, and there is very little inquiry or sale of furnace grades. Restriction of output is proceeding in all districts. There has been some buying of furnace coke, but very little inquiry is as yet unsatisfied and with the rapid blowing out of stacks reported from all districts, little business is expected for several months. Spot Connellsville furnace grades are quotable at \$1.70 to \$1.90 and on contract the price ranges from \$1.90 to \$2.15. Connellsville foundry is selling at \$2.25 to \$2.50 for spot shipment and \$2.40 to \$2.65 on contract. Wise County brands are quotable at about the same as the Connellsville product.

Finished Iron and Steel.—The large structural iron and steel concerns report business very quiet, with nothing of any size in prospect in this territory. One representative of a large interest here reports 10,000 to 15,000 tons for important structures still in abeyance. The erecting men, who have been on strike for some time, are still out, but some of the concerns have signed with the ornamental men, and the carpenters have also won out in their efforts for higher pay. The progress of organization of the new Union Depot & Terminal Company is watched with considerable interest by the structural people, as several thousand tons will be required. The weakest item in this market is probably iron bars, which are quoted at 1.50c., Cincinnati, and on a desirable tonnage this price could be shaded. Nothing is heard of last quarter business and the opinion is given that the attitude of buyers at this time would not justify the naming of a price. Prices on steel bars and structural material are unchanged. Specifications are lagging.

Old Material.—Predictions of dealers that the scrap markets would reach lower levels are verified, and a buyer could probably to-day secure any item in the list at from

25c. to 50c. reduction from last week's quoted prices. Attempts to interest the mills are fruitless, and such as are buying are taking in shipments at their own price. Dealers who for months bought heavily are now beginning to buy, if at all, very cautiously. Transactions are so few and so far between that quotations given are merely nominal and hardly sufficient to establish a price. For delivery in buyers' yards, Cincinnati and southern Ohio, we quote as follows:

No. 1 railroad wrought, net ton.....	\$12.00 to \$13.00
Cast borings, net ton.....	5.50 to 6.50
Heavy melting steel scrap, gross ton...	12.00 to 13.00
Steel turnings, net ton.....	6.50 to 7.50
No 1 cast scrap, net ton.....	12.00 to 13.00
Burnt scrap, net ton.....	9.00 to 10.00
Old iron axles, net ton.....	16.00 to 17.00
Old iron rails, gross ton.....	17.50 to 18.00
Old steel rails, short, gross ton.....	15.00 to 15.50
Old steel rails, long, gross ton.....	15.00 to 15.50
Relaying rails, 56 lb. and up, gross ton.	22.00 to 23.00
Old car wheels, gross ton.....	13.00 to 13.50
Low phosphorus scrap, gross ton.....	16.00 to 16.50

Cleveland

CLEVELAND, OHIO, May 17, 1910.

Iron Ore.—Shipments down the lakes are increasing slowly and little improvement is expected in the movement before the end of the month. Many more boats are in commission than are needed at present in the ore trade and many of the big lake carriers are compelled to wait for cargoes. Few of the merchant furnaces are willing to take ore at present, but in a number of cases this is due to repairs that are being made in furnace yards, this work not having been completed as soon as expected owing to unfavorable weather conditions early in the spring. No sales or inquiries are reported. We quote prices as follows: Old range Bessemer, \$5; Mesaba Bessemer, \$4.75; old range non-Bessemer, \$4.20; Mesaba non-Bessemer, \$4. The market is firm and there seems to be no possibility that the ore men will consider a reduction of 50c. a ton to last year's prices because of the present weakness of the pig iron market.

Pig Iron.—While inquiries are still light a slight improvement in the demand is noticed. With the present curtailment in production makers feel that the situation shows signs of improvement. Prices appear to have reached bottom and some furnace interests are firm in their refusal to meet the present low quotations. For No. 2 foundry \$15, Valley furnace, represents the bottom of the market. Sales are reported at that price for delivery through the last half, but some tonnage was sold during the week at \$15, at furnace, for No. 3. Shipments on contract are only fair. Some foundries have apparently overbought, so that deliveries on iron contracted for the first half will be extended well into the third quarter. The largest sale reported was 1000 tons of Nos. 2 and 3 foundry to an engine manufacturer in Erie, Pa., for delivery until the end of the year, the bulk of this tonnage going to the local furnace. A northern Ohio foundry is in the market for 600 tons of Northern foundry and 500 tons of Southern for the last half delivery. A few inquiries are also pending for smaller lots for the same delivery. For delivery through the second quarter, we quote, delivered, Cleveland, as follows:

Bessemer.....	\$17.90
Northern foundry, No. 1.....	\$16.50 to 17.00
Northern foundry, No. 2.....	16.15 to 16.50
Northern foundry, No. 3.....	15.75 to 16.00
Gray forge.....	15.90
Southern foundry, No. 2.....	16.10 to 16.35
Jackson Co. silvery, 8 per cent. silicon.	21.05 to 21.55

Coke.—The market is dull. Prices remain about stationary and producers feel that they will go no lower. We quote standard Connellsville furnace coke at \$1.65 to \$1.80, per net ton, at oven, for spot shipment, and \$1.80 to \$2.05 on contract for the last half. Connellsville 72-hour foundry coke is held at \$2.25 to \$2.35 for spot shipment, and \$2.35 to \$2.50 for the last half.

Finished Iron and Steel.—The general feeling seems to show some improvement, although the volume of business remains about stationary. More inquiries for prices on plates and structural material have come out the past few days than for some time, these inquiries being from contractors and manufacturing plants who want to be protected on prices for good sized tonnages for work on which they are figuring. The firmness of the steel bar market is also helping the situation. Some consumers who have been holding off now feel that they will be unable to secure a lower price than 1.45c., Pittsburgh, for steel bar tonnage, and appear more willing to contract ahead. A few new contracts have been closed by implement makers and other consumers. Deliveries on steel bars are somewhat easier and shipment of some sizes can be secured in about 30 days. Some of the mills cannot promise shipment within 90 days and longer, however, and sales are still reported as high as 1.75c., Pittsburgh, for immediate shipment. That the general demand

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is not better at the present time is attributed largely to the fact that many consumers bought beyond their requirements a few months ago and now have large stocks on hand. Others are holding back because their own new orders are not as plentiful as they were a few months ago. The demand for plates is only fair, being limited to small lots for immediate needs, and prices are not firm. While 1.50c., Pittsburgh, is being quoted for desirable orders, and 1.55c. for small tonnages, one or two mills are understood to be shading the price to 1.45c. Structural material is firm, at 1.55c., Pittsburgh, and a fair volume of small orders is coming out. An addition to the Brown Building, Cleveland, will require about 1100 tons, and an addition to the plant of the Chandler & Price Company, 300 tons. Inquiries are also out for structural material for a new plant to be built by the Canton Sheet Steel Company, Canton, Ohio. The demand for sheets is only fair and prices continue to be shaded, the maximum concession being \$2 a ton on black and \$3 a ton on galvanized. There is a good demand for light rails in car lots. An order for 700 tons for the extension of a traction line is pending. The demand for shafting is heavy. Orders for iron bars are fair, but consumers are not contracting for future delivery. Prices are stationary, at 1.45c. to 1.50c., Cleveland. Warehouse business with jobbers continues good.

Old Material.—The market continues lifeless and the continued absence of a demand has resulted in a further decline on several grades, ranging from 25c. to 50c. a ton. An inquiry from a dealer who had sold short caused a slight flurry in heavy melting steel during the week and the price was run up about 75c. above the usual quotations, but soon dropped back to its former level. Not much scrap is being offered. Producers and dealers as a rule are holding for better prices. About the only demand from consumers is for car lots for immediate delivery. Prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails.....	\$15.50 to \$16.00
Old iron rails.....	17.50 to 18.00
Steel car axles.....	22.00 to 22.50
Heavy melting steel.....	13.75 to 14.25
Old car wheels.....	15.00 to 15.50
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable.....	13.00 to 13.50
Railroad malleable.....	14.50 to 15.00
Light bundled sheet scrap.....	10.00 to 10.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.50 to \$22.00
Cast borings.....	7.00 to 7.25
Iron and steel turnings and drillings.....	8.00 to 8.50
Steel axle turnings.....	10.50 to 11.00
No. 1 busheling.....	12.00 to 12.50
No. 1 railroad wrought.....	14.50 to 14.75
No. 1 cast.....	12.75 to 13.25
Stove plate.....	11.00 to 11.50
Bundled tin scrap.....	11.00 to 11.50

Birmingham

BIRMINGHAM, ALA., May 16, 1910.

Pig Iron.—The aggregate tonnage sold during the past week is probably smaller than the week previous, but prices have been maintained and the situation as a whole is more satisfactory. Of the tonnage recently placed, 1700 tons are reported by one interest. This was for delivery during the remainder of this year and was engaged at \$12, Birmingham, for No. 2 foundry, with a differential of 50c. for the lower grades. An aggregate of some 1000 to 1500 tons is reported sold by another producing interest at \$12, Birmingham, for delivery to cover the remainder of this year, and still other producers report the sale of lots ranging from 200 to 500 tons each for comparatively early shipment at the same price. It is now understood that the iron available at lower figures than a basis of \$12, Birmingham, is entirely with two producers who have an advantage of 25c. in freight to certain localities. The interests referred to have quoted \$11.75 f.o.b. their furnaces during the past week for comparatively small lots for early shipment. It is probable that round tonnages to cover the remainder of this year could be had at prices just mentioned if a firm offer was made, but no such quotation has been authorized. Lower figures than a \$11.75 basis have not been heard of for any delivery, and a leading producing interest adheres to former prohibitive price of \$13, Birmingham. Inquiries pending at this time are very encouraging, and melters are believed to be more disposed to meet the views of producers. A local melter is to place contract for 3000 tons during the coming week for shipment over the last half, and a leading melter in another territory is in the market for a round tonnage of No. 4 foundry. The small lots of lower grades than a No. 4 that are to be placed during the coming week aggregate a round tonnage, with such grades very scarce. There has been no further reduction in the output of foundry iron, but one furnace reported in blast last week is not in blast, and the production is represented by 15 stacks, with 11 idle, instead of 16 stacks with 10 idle. The movement from furnace yards is about equal to the present

make, although requests that shipment against high priced contracts be deferred are numerous.

Cast Iron Pipe.—Quotations on water pipe are unchanged and the volume of business transacted in this market during the past week is fairly satisfactory. Comparatively small lots have been the principal considerations for some weeks past, but order book requirements generally have kept well ahead of the production and producers are not disposed to offer inducements for larger contracts. It is noted that the movement of raw material to the pipe producing interests has not been checked by the decline in prices and that the most encouraging prospect in the pig iron market to-day is the probable early requirement of such interests. We quote water pipe as follows, per net ton f.o.b. cars here: 4 to 6 in., \$24; 8 to 12 in., \$23; over 12 in. average \$22, with \$1 per ton extra for gas pipe.

Old Material.—Reports from local dealers do not indicate a larger demand for this material. The sales effected during the past week were very insignificant in the aggregate, comparatively, and prices are believed to be declining. Additions to stocks on dealers' yards are made with some reluctance, except in cases of especially attractive prices and classifications generally are more rigid than formerly. We quote dealers' asking prices nominally as follows, per gross ton f.o.b. cars here:

Old iron axles.....	\$17.00 to \$17.50
Old iron rails.....	13.00 to 13.50
Old steel axles.....	16.50 to 17.00
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	9.50 to 10.00
No. 1 country wrought.....	9.00 to 9.50
No. 2 country wrought.....	8.50 to 9.00
No. 1 machinery.....	10.50 to 11.00
No. 1 steel.....	9.50 to 10.00
Tram car wheels.....	10.00 to 10.50
Standard car wheels.....	11.50 to 12.00
Light cast and stove plate.....	7.50 to 8.00

Buffalo

BUFFALO, N. Y., May 17, 1910.

Pig Iron.—The week has shown some tendency toward improvement, both in inquiry and orders. The total sales in foundry and malleable grades were about 12,000 tons, with negotiations pending on inquiries for about an equal amount, principally in these grades and for forward delivery. Prices are slightly firmer, furnacemen as a rule not making urgent solicitation for orders at the present schedule, in view of the fact that with curtailment of production in effect stocks on hand are being steadily reduced. Though labor disturbances are having some degree of effect on foundry operations in this district, the aggregate melt continues large, and notwithstanding the fact that a few consumers are unable to take in full current deliveries on contracts, shipments from furnaces are heavy. We quote as follows, per gross ton, f.o.b. Buffalo, for current and last half deliveries:

No. 1 X foundry.....	\$16.25 to \$16.75
No. 2 X foundry.....	16.00 to 16.50
No. 2 plain.....	16.00 to 16.25
No. 3 foundry.....	15.75 to 16.00
Gray forge.....	15.50 to 16.00
Malleable.....	16.00 to 16.75
Bessemer.....	17.25 to 18.00
Basic.....	16.00 to 16.75
Charcoal.....	19.25 to 19.75

Coke.—Foundry coke requirements are now being covered in good volume by melters, there having been a heavy run of orders placed during the week.

Finished Iron and Steel.—A much better sentiment has developed in the past few days. The improved demand for car building material and railroad equipment and the effect of the abridgement of production in pig iron have imparted a firmer feeling and a considerable inquiry from consumers who are not covered in bar material for their forward requirements has been received during the week amounting to several thousand tons. Specifications against contracts are also coming forward in good volume. Prices on steel bars are firm at 1.50c., Pittsburgh, for current specifications, with 1.45c. quoted for desirable contracts. In structural and plate material the demand has been fairly active, but at prices which are a little easier, 1.60c., Pittsburgh, for current orders and 1.55c. for desirable specifications being the ruling quotations. A good volume of business is in sight on structural projects to come up during the summer. Plans are in preparation for the new Sherman House, an eight-story hotel at Jamestown, N. Y., requiring about 1100 tons of steel, and for the Hutchinson High School, Buffalo, requiring a considerable tonnage. The Buffalo Structural Steel Company has received contract for the 250 tons of steel required for the Wellman Bros.' department store, Jamestown, N. Y., and the Wurtz & Son Iron Works for steel for a coal storage bunker and trestle to be built at the plant of the Republic Metalware Company, Buffalo, about 100 tons.

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Old Material.—Little business is being transacted in this market, the demand being very slack in all lines, except No. 1 railroad wrought, for which there is some inquiry and shipments on contracts are also very slow, being held back except for absolute daily requirements of consumers. We quote as follows, per gross ton, f.o.b. Buffalo, the prices given for most grades being nominal and based on prices ruling in other markets, freights being taken into consideration:

Heavy melting steel.....	\$13.50 to \$14.00
Low phosphorus steel.....	18.50 to 19.00
No. 1 railroad wrought.....	15.50 to 16.00
No. 1 railroad and machinery cast scrap.....	14.50 to 15.00
Old steel axles.....	18.00 to 18.50
Old iron axles.....	22.75 to 23.25
Old car wheels.....	15.00 to 15.50
Railroad malleable.....	15.00 to 15.50
Boller plate.....	12.00 to 12.50
Locomotive grate bars.....	11.50 to 12.00
Pipe.....	11.50 to 12.00
Wrought iron and soft steel turnings.....	7.25 to 7.75
Clean cast borings.....	6.00 to 6.50
No. 1 busheling scrap.....	12.50 to 13.00

St. Louis

ST. LOUIS, Mo., May 16, 1910.

Coke.—The market continues quiet. Inquiry has failed to round up any transactions of note. Until the pig iron market appreciates, an advance in coke is not looked for, since it is, at present, fully as dear as is warranted by conditions. We continue our quotations for standard brands of Connellsville 72-hour foundry at \$2.35 per net ton for spot shipment; for contract, \$2.50, f.o.b. oven.

Pig Iron.—Most sales offices report business quite dull. A leading house notes a sale of 1500 tons to an Illinois company and some sales of 500 tons each, which carried the total to 3000 tons, most Southern foundry, and nearly all for last half shipment. It is reported that a leading local steel foundry closed a contract for 5000 tons of Ohio basic for shipment over the last quarter. As far as can be learned nobody is offering No. 2 Southern foundry for shipment over the last half under \$12, Birmingham, and some of them state that they have had offers of less turned down. For that reason they will now refuse to entertain such offers. Consumers that can take prompt shipment would stand a chance of a concession. Numerous inquiries indicate an increasing interest in the market. While in the case of some Southern furnaces the price is held at \$12.50, Birmingham, for the last half, we quote the market at \$12 for that delivery with a concession for prompt and a premium asked for last quarter. Southern Ohio is quoted at \$15.50 for May and June and \$16 for last half, f.o.b. furnace.

Lead, Spelter, Etc.—Lead is quiet at 4.15c. and spelter is strong at 5.20c., f.o.b. East St. Louis. Zinc ore is \$35 per ton, Joplin, base. Tin is 10c. per 100 lb. higher; antimony no change; copper is 1/4c. per pound higher. The demand for finished metals ruled quiet last week.

Old Material.—Leading dealers state that there is an improvement in the outlook, and this leads to a firmer feeling. No railroad lists were offered last week. We continue our quotations, with the proviso that transactions are still almost entirely confined to dealers. We quote dealers' prices as follows, per gross ton, f.o.b. St. Louis:

Old iron rails.....	\$15.00 to \$15.50
Old steel rails, rerolling.....	15.00 to 15.50
Old steel rails, less than 3 ft.....	13.50 to 14.00
Relaying rails, standard sections, subject to inspection.....	26.00 to 26.50
Old car wheels.....	15.00 to 15.50
Heavy melting steel scrap.....	13.50 to 14.00
Frogs, switches and guards, cut apart.....	13.50 to 14.00

The following quotations are per net ton:

Iron fish plates.....	\$14.00 to \$14.50
Iron car axles.....	21.00 to 21.50
Steel car axles.....	19.50 to 20.00
No. 1 railroad wrought.....	13.50 to 14.00
No. 2 railroad wrought.....	12.50 to 13.00
Railway springs.....	12.00 to 12.50
Locomotive tires, smooth.....	16.50 to 17.00
No. 1 dealers' forge.....	11.00 to 11.50
Mixed borings.....	6.50 to 7.00
No. 1 busheling.....	12.00 to 12.50
No. 1 bolters, cut to sheets and rings.....	9.50 to 10.00
No. 1 cast scrap.....	11.50 to 12.00
Stove plate and light cast scrap.....	9.50 to 10.00
Railroad malleable.....	11.25 to 11.75
Agricultural malleable.....	10.00 to 10.50
Pipes and flues.....	9.25 to 9.75
Railroad sheet and tank scrap.....	8.50 to 9.00
Railroad grate bars.....	9.00 to 9.50
Machine shop turnings.....	9.50 to 10.00

The Kant Leak Kleet Company, St. Louis, has been incorporated to manufacture and deal in metal roofing; capital stock, fully paid, \$20,000; incorporators, Harry W. Hulity, Muscatine, Iowa; Wm. H. Woerheide, Geo. J. Gruber, P. W. Haberman and S. Edward Gutierrez of St. Louis.

The Missouri Pacific Railroad has placed an order for

20 passenger, 30 freight and 10 switching engines with the Baldwin Locomotive Works, delivery on which will begin next month. Including this order, the railroad company has within two years purchased 160 engines. The earnings for the fiscal year will be the greatest in its history.

Negotiations have been completed for the building of an East St. Louis plant for the Granby Mining & Smelting Company. The new plant will be built on a tract of 150 acres and will cost upward of \$1,000,000. Employment will be given to 600 men.

San Francisco

SAN FRANCISCO, CAL., May 11, 1910.

The attention of San Francisco interests is largely occupied by impending labor difficulties. Following the agreement of 1907, the working day in local foundries and machine shops is to be reduced to eight hours on June 1. The agreement was made with the understanding that the eight-hour day should be introduced in the other cities of the Pacific Coast. This has not been done. The market for finished products outside of San Francisco continues active, no perceptible decrease being noted in any department, while in some lines the demand is increasing. A large proportion of the business is still handled from local warehouses, the importation of foreign material tending to limit the tonnage booked by rolling interests, particularly in bars. The inquiry for bars at present is greater than normal, and the same may be said of plates and merchant pipe. Plates are still in strong demand for tank work, and there is every prospect of activity throughout the summer. The smaller sizes of merchant pipe also receive more attention, though there is not yet any general movement from manufacturer to jobber. The structural situation shows a slight improvement, though most fabricating contracts are small. Conditions are very encouraging for the cast iron pipe interests, with a general buying movement all over the coast.

Bars.—The demand for bars increased materially during the last month. The movement for the first quarter was highly disappointing, but the recent tonnage sold by local merchants has been above the average. Inquiries are still numerous and present indications favor an increasing tonnage for the remainder of the second quarter. Bookings by domestic rolling interests are still moderate, as many of the local merchants continue to rely on the foreign market. Foreign steel bars are offered for delivery here at about 1.85c. and a considerable tonnage is being placed, as supplies in store are gradually being reduced. There is a general tendency among Pacific Coast merchants to estimate their requirements sufficiently far in advance to place their orders with foreign mills, which are getting out the material promptly, and as the date of arrival can be known with some accuracy this practice causes little inconvenience. Jobbing prices are firmly maintained, the quotations remaining at 2.50c. for steel and 2.30c. for iron.

Rails.—Bookings of standard sections continue on about the same scale as for some time, the majority of orders being for moderate quantities. Purchases are still being made for extensions to street and interurban roads, and occasional inquiries are received from logging interests. Light rails are comparatively quiet, though the movement of 8 to 12 lb. sections of late has caused a material reduction of supplies in store. California mining interests, which were liberal buyers of light rails last summer, are inclined to keep out of the market at present. The Mascot Copper Company is planning an 18-mile road in Arizona. The Northern Electric Railroad Company is preparing to build a line between Marysville and Colusa, Cal. The Imperial Valley Railroad Company intends to construct 100 miles of road in the Imperial Valley in southern California.

Structural Material.—The building situation on the Pacific Coast is indicated in a general way by the building permits issued in April. A considerable increase was noted in San Francisco, with a total of \$2,320,826. The Los Angeles total was the highest ever recorded in that city, \$3,434,400, and Oakland, Cal., showed a total of \$1,621,423. Portland, Ore., also made a new high record. The volume of fabricating work is rapidly increasing on the Pacific Coast as a whole, while the tonnage in San Francisco is at about the lowest level reached since 1906. Since the end of April work in this city has been coming out rather more freely than for a few weeks preceding, but few of the jobs are of any importance. There is, however, considerable large work in sight, including two buildings which have been in the market for several months and a few for which plans are just being completed. A project has been started to issue \$600,000 bonds for the erection of a large public library building in San Francisco, tentative plans for which have been presented. In addition to large court house buildings at Bakersfield and Fairfield, Cal., a number of small outside jobs are coming into the market. A contract is expected in the near future for a large federal building at Bellingham, Wash. Dyer

The Iron and Metal Markets

Bros., San Francisco, are fabricating small quantities for the Balaklala Copper Company's smelter, the Columbia Steel Company's plant at Black Diamond, Cal.; the Pacific Gas & Electric Company at San Jose, and a Government coal chute at Mare Island. Beams and channels, 3 to 15 in., from store, San Francisco, are quoted at 2.70c.

Pig Iron.—The pig iron market in San Francisco is practically at a standstill, in view of pending labor troubles in the foundries. Foundry work in other coast cities is more active, but no large tonnage of pig iron is being sold in any quarter at the moment. Considerable irregularity as to prices is found, as it appears impossible to move any considerable quantity of ordinary grades except at a sacrifice. Quotations named by leading importers on cargoes to arrive are nominally about as before, but the only recent sales reported consist of odd lots from warehouse. Under present conditions values are too indefinite to be quoted.

Cast Iron Pipe.—While no exceptionally large orders have been booked this month, the aggregate tonnage keeps up extremely well. Nearly every important water and gas company on the coast has been in the market for varying amounts needed to carry out extensions and renewals in the immediate future. Few orders are being placed for distant requirements, but the amount of work projected gives assurance of an active market for the remainder of the year. Cast pipe was not extensively used for water distributing systems on the Pacific Coast until recent years, but is now employed for this purpose almost to the exclusion of other materials, which are being replaced in many localities. The rapid growth in population of towns in the interior of California has made extensions of both gas and water systems necessary, and this work is being done as rapidly as financial arrangements can be made.

Merchant Pipe.—It is possible that local merchants may come into the market earlier than was expected, owing to increasing demand for the smaller sizes carried in stock. Supplies are still large, but are rapidly decreasing, and there is a disposition to keep a fair tonnage on hand. Orders for delivery to the oil fields still form the greater part of bookings by mill interests. While the heavy increase in the production of oil has caused some nervousness in that quarter, the demand for pipe continues fair. The Santa Fe Railroad is preparing to lay a 6-in. rifled pipe line from its oil property at Olinda, Cal., to San Bernardino, a distance of 45 miles. The city of Los Angeles has just placed an order for 2-in. pipe. Jobbing prices on merchant pipe are firmly maintained.

Old Material.—Arrangements have been made to ship to the East another cargo of steel scrap. The shipment is to be made by a steel hulk, which was to have been placed on this market as scrap, but has been sold to Eastern parties and will be towed to the Atlantic coast. Cast iron scrap is still quiet, few melters being actively in the market. Old rails are still in good demand. Prices are quoted as follows: Cast iron scrap, \$17 to \$17.50 per gross ton; steel melting scrap, \$10 per gross ton; railroad wrought scrap, \$14 per net ton; rerolling rails, \$14 per net ton.

The Western Pipe & Steel Company has succeeded to the business of the Francis Smith Company, manufacturer of riveted steel pipe, San Francisco and Los Angeles. The San Francisco office is at 9 to 15 Fremont street.

The Pacific Hardware & Steel Company has about completed plans for increased facilities at Portland, Ore. A four-story brick building, 200 x 300 ft., will be built for a wholesale hardware store, and a large one-story warehouse, equipped with an electric crane and spur track facilities, for the storage of iron and steel. The company's rolling mill at Portland is running at full capacity.

The Western Steel Company has been incorporated in San Francisco, with a capital stock of \$75,000, by J. P. Lucey, A. Haase, G. C. W. Egan, A. L. Fagothey and B. Hastings.

Representatives of the San Francisco Machinists' Union are endeavoring to organize the machinists at Seattle, Wash., for the purpose of demanding an eight-hour day.

The Gray's Harbor Hardware Company, Aberdeen, Wash., successor to the Vulcan Iron Works, is arranging for the construction of a new hardware warehouse.

New York

NEW YORK, May 18, 1910.

Pig Iron.—Inquiry from foundry buyers has been coming in in larger volume in the past few days. In one case 5000 tons is asked for, in another 3500 tons, in a third 3000 tons; there are two or three 1000-ton inquiries and several for 500 tons. In territory tributary to New York City, taking in New Jersey, the Hudson Valley in New York and a part of Connecticut, it is estimated that 25,000 to 30,000 tons is now under inquiry. How much of this will result in business, and whether it represents the beginning of a

moderate buying movement, are questions that can be better answered in a week or two. The inquiries represent foundries making agricultural, electric, boiler and machinery castings and for the most part the deliveries wanted are third quarter and last half. Further pipe foundry buying is reported, along with some offers for pipe iron that are from 50c. to 75c. below figures Eastern furnaces are willing to entertain. The week has not been up to recent ones in business actually closed, and prices are practically unchanged, most sellers holding to what they have recently maintained, though slightly lower offers are reported from some others, indicating that bids of \$16.50 for No. 2 X at eastern Pennsylvania furnaces are not low enough to secure business. Southern furnaces as a rule are not shading the \$12, Birmingham basis for forward deliveries. Some inquiry for malleable Bessemer is being revived, but the gray iron foundries are the principal interests sounding the market. We quote Northern iron for early delivery at tidewater as follows: No. 1, \$17.25 to \$17.50; No. 2 X, \$17 to \$17.25; No. 2 plain, \$16.75 to \$17. On Southern iron for prompt delivery we quote \$16.75 to \$17 for No. 1 and \$16.25 to \$16.75 for No. 2.

Steel Rails.—Some business is pending that will naturally go to Eastern mills. Among orders closed at Pittsburgh are 900 tons for the Monongahela Railroad Company, 1000 tons for the Wichita Falls & Northwestern, 500 tons for the Manatee & Northwestern and 900 tons for the Hopatcong Construction Company. The Colorado mill has booked 1100 tons for the Denver City Tramways and 1000 tons for the Ontario & San Antonio Heights. The Alabama mill has taken 1500 tons of new business in the past week and the Chicago district mills 5000 tons.

Ferroalloys.—Ferrosilicon can be had at around \$60, Pittsburgh. The price has been advanced above that figure by some sellers, but there are others in New York willing to dispose of their stock at that quotation. The price for ferromanganese is \$41.50, seaport, but there is not much being taken.

Finished Iron and Steel.—The last of the large structural material contracts that have been pending in New York has been closed, that for the Bankers' Trust Building to be erected at Wall and Nassau streets; about 8000 tons will be required and the contract has been awarded to the American Bridge Company. Small lots, in sufficient number to make a fair total, maintain a satisfactory average in business placed and inquired for. A loft building on West Twenty-fourth street of 500 tons was awarded to Levering & Garrigues, and an apartment house at Fifty-fifth street and Ninth avenue, of 400 tons, to the Alfred E. Norton Company. About 700 tons for the apartment house at Ninety-eighth street and Broadway will be furnished by the Eastern Steel Company through the general contractors, Ravitch Brothers. Bids are now being asked for another apartment house, one of 12 stories for the Century Holding Company, to be erected at Fifth avenue and Eighty-first street; McKim, Mead & White are the architects and about 1000 tons will be required. Two fairly large structural contracts outside of New York which have been awarded are those for the Bender Building in Houston, Texas, about 1000 tons, taken by the Mosher Mfg. Company, Dallas, Texas, and the Munsey Building at Baltimore, 800 tons, taken by the Jones & Laughlin Steel Company. Only very few additional awards have been made by the railroads for bridge material. For the Cincinnati, Hamilton & Dayton, 1350 tons was placed with the McClintic-Marshall Construction Company; for the Chesapeake & Ohio, 100 tons, with the American Bridge Company; for the Boston & Maine, 300 tons, in two bridges, one with the Boston Bridge Company and one with the New England Structural Company; and for the Pennsylvania, 400 tons, for a bridge at Bristol, Pa., with the Pennsylvania Steel Company. It is estimated that between 40,000 and 50,000 tons of bridge material that has been more or less definitely in prospect is still unsettled; decisions on some of it are likely to be long deferred. The plate trade in this vicinity is very quiet. Several steamships for coast lines are to be built, two by the Newport News Shipbuilding & Dry Dock Company and two by the Maryland Steel Company. Bids have been asked on two others. Altogether these should bring at least 8000 tons of plates into the market, though probably not in this territory. The demand for steel bars is very active and deliveries are still slow. A fair volume of bar iron orders is reported and one mill finds buyers inclined to contract ahead for long periods. Plain structural material and plates are quoted at 1.66c., smaller lots, 1.71c.; steel bars at 1.61c., and bar iron at 1.50c. to 1.55c., all New York.

Cast Iron Pipe.—The entire construction of the Brooklyn high pressure service was awarded May 11 to a contractor who will purchase the 9000 tons of water pipe required. The Board of Water Supply of Newark, N. J., will open bids May 19 for 1200 tons of 4 to 16 in. In addition to the usual run of orders for moderate sized quantities from private gas

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and water companies, inquiries are being received from quite a number of the more important consumers, indicating that they are now taking an interest in the market, and may probably place their orders for the season. This naturally gives occasion for the presumption that general business in cast iron pipe may shortly show a considerably increased volume. Quotations are continued at \$25.50 to \$26 per net ton, tide-water, for carload lots of 6-in.

Old Material.—Dealers report consumers still indifferent. The transactions of the week have been exceedingly light from that standpoint. The old material offered by railroads this month has been taken quite well, a considerable part of it going directly to consumers and evidently at low figures. Up to this time some demand has existed from the covering of contracts previously taken by dealers, but it is believed that such contracts are practically filled and the demand from this source is now likely to be light. It has been some time since consumers have been disposed to make any contracts for forward deliveries. It would not be surprising if railroad lists next month should have an unusually small number of bidders. Numerous dealers are still pressing old material on the market. The following quotations are per gross ton, New York and vicinity:

Rerolling rails.....	\$12.50 to \$13.00
Old girder and T rails for melting....	12.00 to 12.50
Heavy melting steel scrap.....	12.00 to 12.50
Relaying rails.....	20.00 to 21.00
Standard hammered iron car axles....	22.50 to 23.00
Old steel car axles.....	18.00 to 18.50
No. 1 railroad wrought.....	14.00 to 14.50
Wrought iron track scrap.....	12.50 to 13.00
No. 1 yard wrought, long.....	12.50 to 13.00
No. 1 yard wrought, short.....	12.00 to 12.50
Light iron.....	6.00 to 6.50
Cast borings.....	7.00 to 7.50
Wrought turnings.....	8.00 to 8.50
Wrought pipe.....	12.00 to 12.50
Old car wheels.....	12.50 to 13.00
No. 1 heavy cast, broken up.....	12.50 to 13.00
Stove plate.....	9.50 to 10.00
Locomotive grate bars.....	9.50 to 10.00
Malleable cast.....	12.00 to 12.50

The German Iron Market

BERLIN, May 5, 1910.

It is evident that a less confident feeling is taking possession of the market. This is due rather to foreign reports than to any actual weakness at home, although there is a certain degree of weakness in the latter, too, so far as two or three classes of products are concerned. From nearly all sections reports now agree that business is growing rather quieter, and this has been the case for at least two months. Nothing more has been heard of advances in prices since the heavy plate combination, as already reported, marked up its prices by 2.50 marks about a month ago.

The price tendency is now rather toward a lower than a higher level, but this so far is observed in only two or three lines, such as scrap iron, bars and sheets. The lockout in the building trades has not yet been ended, and it continues to restrict business in bars and builders' hardware as well. Manufacturers of bars, so far as can be learned, are maintaining prices for the home trade, but they are making concessions on export orders. Bars for home consumers continue to be sold at 110 to 112 marks, according to the point from which shipment is made, but the export price of German soft steel bars, free on board at Antwerp, is now 105 marks as a minimum, whereas it averaged about 108 marks several weeks ago. The reaction has been chiefly caused by a fall of prices for Belgian bars.

The pig iron market, although quiet, has lost nothing of its strength. Probably prices would already have been shaded somewhat but for the firmness of foreign ores, on which German works largely depend, and which still show a rising tendency. These foreign ores are scarce, and German furnacemen are buying them actively where an opportunity presents, notwithstanding the rising prices. The home production and shipment of ores keep well up to record figures. Some buying of pig is still going on at the highest prices established some weeks ago, and supplies already contracted for are being called for delivery at a regular pace.

The efforts made toward reorganizing the pig iron trade on a national basis, which were referred to in previous letters, appear to have made no headway at all, and it is now stated with authority that the outlook for a successful conclusion of the negotiations is decidedly dark. The great companies having their own furnaces have quite diverse interests from those which must sell their entire product in the market, and upon this rock the negotiations have split.

An increase in the supplies of waste and scrap iron has led to a further weakening of prices. A meeting was held at Düsseldorf two days ago, with a view toward organizing this department of the trade in the Rhenish-Westphalian region. A positive result was not reached, but a majority of the big mills in that part of the country expressed themselves as

ready to join the movement, and the negotiations will proceed.

In steel billets buying for the third quarter is going on at fixed prices and in satisfactory amounts. It is not believed that the volume of work for the quarter will show any reduction, particularly as there is a good supply of foreign orders on hand, running to the end of September. Naturally there is next to no new home business in structural shapes owing to the lockout in the building trade. Business in rails has apparently suffered no backset owing to the careful nursing of the foreign market on the part of the Steel Syndicate. In heavy plates business continues to improve by reason of the larger demand from shipbuilding companies, but in thin plates or sheets trade has grown worse, and prices are weakening. In bands and strips the home trade is very active, but a lighter export movement is reported. The foreign market is making heavy demands for wire rods, but wire has become somewhat quieter. Dealers had bought large quantities in expectation that the manufacturers would succeed in putting their organization upon a firmer footing in place of their present price agreement, but this fear has been proved groundless, and now dealers are holding off. The international convention in wire met at Cologne last week and decided to retain the existing price scale, and at the same time it was given out that business was satisfactory. The German price combination in wire, wire nails and other wire products voted this week to begin taking business for the next quarter at unchanged prices.

It is understood that an exchange of views has been made among the great works of the Steel Syndicate in regard to prolonging it beyond the time when the present arrangement expires. It is reported with good authority that some important works are in favor of breaking up the present organization and substituting several smaller organizations, one for each class of products. It is too early, however, to expect positive action on this question.

Metal Market

NEW YORK, May 18, 1910.

THE WEEK'S PRICES

Copper.			Lead.			Spelter.		
May.	Lake.	Electro-lytic.	Tin.	New York.	St. Louis.	New York.	St. Louis.	St. Louis.
12.....	13.00	12.75	33.15	4.30	4.15	5.05	4.90	
13.....	13.00	12.75	33.15	4.30	4.15	5.10	4.95	
14.....	13.00	12.75	4.30	4.15	5.20	5.05	
16.....	13.00	12.75	33.25	4.35	4.10	5.30	5.15	
17.....	13.00	12.75	33.20	4.35	4.20	5.30	5.15	
18.....	13.00	12.75	33.20	4.35	4.20	5.30	5.15	

The market in all raw metals is quiet. Prices are weak, with the exception of spelter, which has strengthened materially during the week, although there has been but little buying. The recent reduction in the price of lead has failed to bring buyers into the market.

Copper.—Copper is not particularly strong. Early in the week the nominal price of electrolytic was sent up to 13c., but the absence of buyers from the market and anxiety to sell on the part of some holders brought about a reduction again. The only grade of copper that shows any strength is casting copper, and holders of that are demanding as much as electrolytic brings. It is apparent that most large consumers have filled their wants for the time being and they refuse to take any interest in the market. Notification was sent out by a prominent seller that electrolytic could be had for 12.75c., but from all accounts it brought no results. We quote electrolytic at that price and lake copper at 13c. The exports so far this month indicate that the shipments for May will be better than in April. Up to date 10,398 tons has been sent abroad. In London to-day spot copper sold for £56 2s. 6d, and futures for £57.

Pig Tin.—There has been a fair amount of buying in pig tin, but not as much as is looked for at this time of the year. It is apparent that the low price of other metals is having some effect on the pig tin situation. Consumers seem to be playing a waiting game, possibly in the hope that there will be further reductions in price. The arrivals of pig tin so far this month have been 1395 tons and there are 1420 tons afloat. Spot tin sold in London to-day for £150 12s. 6d., and futures for £152.

Lead.—The price of lead made by the outside interests advanced five points on Monday. This was largely due to the arrival of a number of inquiries in the market which indicated that consumers are more anxious to buy. Lead is in a very sensitive condition just now and it is hard to predict what a buying movement might bring about in the way of advancing prices. There are some outside sellers of lead who declare that they could not realize a profit at the existing prices and they are disappointed in the action of the leading interest in reducing quotations. It is apparent that consumers generally were better supplied with lead than the sellers had expected, but it is not thought that they will

The Iron and Metal Markets

be able to hold off much longer and the expected spring buying movement may come very shortly. The price of lead in New York to-day is 4.35c., and in St. Louis the market is quoted at 4.20c.

Tin Plates.—Tin plates are in better supply and buyers are having little difficulty now in getting deliveries. This is a relief to them, as for the last three months tin plates have been especially hard to get. Many of the independent mills that have been demanding premiums have reduced their asking price to that quoted by the leading interest, which is \$3.84 for 100-lb. coke plates. The price for Swansea tin plates has not changed during the week and they can be had for 13s. 3d.

Spelter.—The nominal price of spelter has bettered during the last few days and there seems to be a concerted action on the part of the producers to advance quotations. There are few buyers in the market and only a little spelter has been taken of late. It is said that the producers were by no means anxious to sell at the prices which prevailed last week and in a number of cases purchasers who wanted to get the metal at the quoted prices were unable to get their orders accepted. The New York market is quoted at 5.30c., and at St. Louis the price is 5.15c. There is so little buying that these quotations are largely nominal.

Antimony.—Sales of antimony during the last week have been slightly better than for some time, but prices are unchanged. Hallett's can be had at 8.12½c. and Cookson's at 8.37½c. per pound. The Hungarian grades are quoted at around 7.25c.

Old Metals.—The market is quiet, with dealers' selling prices nominally unchanged, as follows:

	Cents.
Copper, heavy cut and crucible.....	12.25 to 12.50
Copper, heavy and wire.....	12.00 to 12.25
Copper, light and bottoms.....	11.00 to 11.25
Brass, heavy.....	8.50 to 8.75
Brass, light.....	7.00 to 7.25
Heavy machine composition.....	11.50 to 11.75
Clean brass turnings.....	7.75 to 8.25
Composition turnings.....	9.75 to 10.00
Lead, heavy.....	4.05 to 4.20
Lead, tea.....	3.80 to 3.95
Zinc scrap.....	4.25 to 4.50

The Texas Iron Ore Deposits.—It is announced that it will probably be six months until the Santa Fé Railroad has finished its line into the east Texas iron ore fields that are to be exploited by the Bethlehem Steel Company. The ore shipments via Galveston to Bethlehem will be started as soon as the transportation outlet is opened. The Santa Fé is making extensive improvements at the sub-port of Bolivar, opposite Galveston, where its north and south line through east Texas has its Gulf terminus. The loading and unloading facilities at the docks are modern in every respect. According to recent reports, a large deposit of high-grade iron ore has been discovered in the extreme southwestern part of Texas, near the surveyed route of the Kansas City, Mexico & Orient Railroad, between Alpine and the proposed crossing point of that road on the Rio Grande. The ore body is said to cover several sections of lands owned by the State.

Tod Engines for Rogers-Brown Furnaces.—The William Tod Company, Youngstown, Ohio, has received a contract from the Rogers-Brown Iron Company, Buffalo, N. Y., for three blast furnace blowing engines, to have a capacity of 41,000 cu. ft. at 40 rev. per min. The engines are of the horizontal cross-compound type with tandem air cylinders. The high-pressure steam cylinders are 48 in. in diameter; low pressure, 90 in. in diameter; air cylinders 90 in. in diameter, all having a stroke of 72 in. The engines are to be duplicates of the four furnished by the William Tod Company to the Youngstown Sheet & Tube Company, except that the air cylinders will be smaller, being of the same size as the four similar engines furnished by the Tod Company for the Gary plant of the United States Steel Corporation.

Report of Pipe Mill at Gary Denied.—Press reports that the National Tube Company, Pittsburgh, had made plans for the building of a large pipe mill at

Iron and Industrial Stocks

NEW YORK, May 18, 1910.

The stock market has been quiet, but values have been well held, notwithstanding the limited transactions. The range of prices on active iron and industrial stocks from Thursday of last week to Tuesday of this week was as follows:

Allis-Chalm., com.. 9% - 9%	Pressed St., pref..... 99
Allis-Chalm., pref.. 34 - 34½	Railway Spr., com. 39% - 40
Beth. Steel, pref..... 53	Railway Spr., pref. 103 - 104
Can, com..... 9% - 10%	Republic, com..... 33½ - 34
Can, pref..... 73 - 73½	Republic, pref..... 97½ - 97½
Car & Fdry, com.. 60% - 62	Sloss, com..... 73½ - 75
Car & Fdry, pref..... 115	Pipe, com..... 22
Steel Foundries... 54 - 56½	Pipe, pref..... 74 - 75
Colorado Fuel... 38 - 38½	U. S. Steel, com... 82 - 84
General Electric... 149 - 150½	U. S. Steel, pref... 118 - 118½
Gr. N. ore cert... 63 - 64½	Westinghouse Elec. 64 - 64½
Int. Harv., com... 93 - 98	Am. Ship, com... 82 - 84½
Int. Harv., pref... 120½ - 121	Am. Ship, pref... 111
Int. Pump, com... 47 - 49	Chl. Pneu. Tool... 43 - 44
Int. Pump, pref... 85 - 86½	Cambria Steel... 46 - 47½
Locomotive, com... 48½ - 50	Lake Sup. Corp... 22½ - 24
Locomotive, pref... 108½ - 109	Pa. Steel, pref... 168
Nat. En. & St. com. 20½ - 21	Crucible St., com... 13% - 13½
Nat. En. & St., pref... 85½	Crucible St., pref... 85 - 85½
Pressed St., com... 39½ - 40	Harb.-W. Ref., com... 35

Last transactions up to 1 p.m. to-day are reported at the following prices: Allis-Chalmers common 9%, preferred 34; United States Steel common 82½, preferred 118, bonds 104; Car & Foundry common 60½, preferred 115; Locomotive common 47½, preferred 108½; Colorado Fuel 37½; Pressed Steel common 39%, preferred 99; Railway Spring common 39%; Republic common 33½, preferred 97½; Sloss-Sheffield common 74½; Cast Iron Pipe common 22, preferred 74; Can common 9%, preferred 73½.

Dividends.—The Sloss-Sheffield Steel & Iron Company has declared the regular quarterly dividend of 1¼ per cent. on the common stock, payable May 20.

The Harbison-Walker Refractories Company, Pittsburgh, has declared a dividend of one-half of 1 per cent. on the common stock, payable June 1. J. J. Brooks, Jr., was elected a member of the board of directors, vice W. B. Wigton, resigned.

Gary, Ind., are premature and are not official. It is not unlikely that at some future time the company may build a pipe mill there, and it is possible that ground has been reserved for it, but up to this time no plans have been made, and any statements that work would start at an early date are entirely unauthorized. It is certain that nothing will be done with the project this year at least.

The Merchants' Association of New York has undertaken a movement in which it has the co-operation of a very large number of commercial organizations in other cities, for the investigation of express rates and practices by the Interstate Commerce Commission, to the end that fair and just rates and practices may prevail. A permanent executive committee was created at a conference for this purpose on May 11 with power to employ counsel to prepare and present a petition to the Interstate Commerce Commission and with full discretion to determine the breadth and scope of the petition.

A boiler explosion at the Canton, Ohio, works of the American Sheet & Tin Plate Company Tuesday night, May 17, killed 13 men and injured 20. Heavy damage was done to the plant. The cause of the explosion has not been determined. The boilers were inspected in January and pronounced safe.

President E. C. Stearns, Syracuse, N. Y., announces that the annual meeting and election of officers of the American Foundrymen's League will be held at Detroit, June 7 to 9, concurrent with the meeting of the American Foundrymen's Association.

The Atikokan Iron Company's blast furnace, at Port Arthur, Canada, has been blown in again, and the company intends doubling the capacity of the coke ovens. The furnace has been completely overhauled and its capacity increased.

Presence and Influence of Gases in Steel*

BY PAUL L. T. HEROULT.

Blow holes in steel ingots invariably contain hydrogen and nitrogen, often only traces of carbon monoxide. On the other hand, it is well known that when a thoroughly sound steel ingot is placed in a vacuum chamber a certain amount of the above named gases will be exhaled or thrown off.

The popular doctrine is that the percentage of the gases present is in proportion to the opportunities of absorbing them as a result of the process or method employed in producing the steel. But the quantities of gases so liberated in the course of thorough and repeated investigations have proved to be about the same, whether it be Bessemer, basic or acid open hearth, or crucible or electric steel.

In view of this, I came to the conclusion long ago that these gases are absolutely innocent and are not the cause of the production or presence of blow holes.

Blow holes are the result of disengagement of certain carbon monoxide, with the exception, of course, of accidental blow holes due to the poor condition of the molds. This carbon monoxide does not pre-exist in the steel. It is only produced when the steel cools down and that part of it has become solid. Steel that will produce blow holes contains in the molten state carbon and at the same time iron protoxide. As long as the steel is molten and hot these two bodies can keep apart, and for each temperature and each composition of steel there is a state of equilibrium at which no chemical reaction takes place. The heat is then what the Germans call "gar"—that is to say, dead melted. If the temperature is increased the reducing action of carbon will be intensified and carbon monoxide will be evolved. If, on the contrary, the temperature is lowered, nothing happens till the steel gets partially solidified, with the effect that the carbon and iron protoxide are crowded in a small space, in what we might call the mother liquor, and monoxide of carbon is evolved. The blow holes produced are filled with a carbon monoxide, at a high temperature. As this gas cools down, however, it creates a vacuum, and we then repeat the conditions of the ingot in the vacuum chamber.

You can understand now why it is that blow holes are found containing hydrogen and nitrogen. Steel does not contain any gases to amount to anything, and whatever small quantities it does contain are not injurious or detrimental as to its quality. As a matter of fact, Bessemer steel, either acid or basic, which has every possible opportunity of absorbing gases, does not contain any more than any other steel.

The United States Radiator Corporation

Further particulars in reference to the merging of several boiler and radiator manufacturers into one concern, says the *Metal Worker*, give the name as the United States Radiator Corporation, with a capital stock of \$8,000,000 and \$1,000,000 in 6 per cent. bonds. There are equal amounts of 7 per cent. cumulative preferred stock and of common stock. There has been issued \$3,200,000 of each. The concerns interested are: United States Radiator Company, Dunkirk, N. Y.; United States Radiator & Boiler Company, Pittsburgh, with plants at West Newton and Cory, Pa.; United States Heater Company, Detroit; Herendeen Mfg. Company, Geneva, N. Y., and the radiator department of the J. L. Mott Iron Works, New York City.

It is said that an accurate appraisalment of the plants and their resources was made, and stock in the new company was distributed to the stockholders of the

merged concerns for every dollar of value shown. It is expected that dividends will be forthcoming from the very start, as the plants are all in possession of good orders. Charles E. Patterson, Dunkirk, N. Y., is president; R. J. Gross, Dunkirk, N. Y., vice-president, and George C. Blackmore, Pittsburgh, secretary. It is claimed that an increase of the already large capacity of the company is contemplated, and that the American Radiator Company is the only strong rival of the company. The president and vice-president have shown executive ability as officers of the American Locomotive Company, and the secretary has shown equal ability in developing a radiator plant, so that there has apparently been no difficulty in financing the new enterprise, which also has the advantage of several full lines of popular styles of radiators and some equally popular steam and hot water heaters.

The Garry Company Buys the Empire Company

A deal was closed May 13 by which the Garry Iron & Steel Company, Youngstown, Ohio, takes over the entire plant and good will of the Empire Iron & Steel Company at Niles, Ohio. The plant contains eight hot sheet mills and three cold mills, and has an annual capacity of about 20,000 tons of black and galvanized iron and steel sheets, shovel steel and cutlery steel. The deal involves something over \$1,000,000. An official statement regarding this sale has been issued, which in part is as follows:

The Empire Iron & Steel Company property was purchased by Jonathan Warner several years ago and has been in continuous operation since that time. During the period of his ownership the mill has been practically rebuilt throughout and it is turned over to the new owners by Mr. Warner in a most satisfactory condition.

It is understood that there will be no change whatever in the operating organization at the Empire Iron & Steel Company's plant, and that there will be no cessation of work there. The company has orders on its books which will keep it filled with work for some months to come. Mr. Warner has no definite plans as to his future business connections, but has stated he will assist the Garry Iron & Steel Company's management at the Empire plant for a short time.

The Garry Iron & Steel Company, which has made the purchase, is a corporation composed almost wholly of Youngstown people, and has operated a plant at Cleveland for many years. By recent action of the stockholders it was determined to remove the plant from Cleveland and to establish sheet mills in connection therewith. With this in view the old Sennett property and the plant of the Reliance Edge Tool Company were purchased at Youngstown, together with some additional land. By the recent trade with Mr. Warner the company acquires a sheet mill plant in operation and it will not be necessary for it to go ahead with its Youngstown improvements at the present time. It has not been fully determined what disposition will be made of the Youngstown properties previously bought, although it is possible that somewhat later additional developments will be had at that point along the lines already worked out.

From the above it will be noted that for the present at least the Garry Iron & Steel Company does not intend to go ahead with its projected open hearth steel plant and rolling mills which it announced as intending to build at Youngstown.

To the splendid equipment of the Empire plant will be added, as soon as possible, a factory for the manufacture of Cleveland expanded metal lath. The general offices will be located at Niles, Ohio, after July 1, and a branch office maintained at Cleveland, so as to better care for the large trade already established in that city.

The Garry Iron & Steel Company has a well established trade in iron and steel roofing and siding, eaves trough, conductor pipe, ridge roll, metal ceiling, dry paint, mortar color, expanded metal lath, terne plate, black and galvanized sheets, &c., and with this up to date sheet mill now at its disposal it hopes to serve its trade better than ever. George D. Wick is president; Samuel Siddall, vice-president and treasurer; Philip Wick, assistant treasurer; J. Charles Wicks, secretary and manager of sales.

* A paper read at the meeting of the American Electrochemical Society, Pittsburgh, May, 1910.

The Machinery Markets

While the railroads show considerable activity, inquiries for machinery from other sources throughout the country show that the market has quieted somewhat. In the East the railroads are the heaviest buyers, and although no business has come as yet from the large lists mentioned last week, it appears that orders will be placed against them before long. In Milwaukee a slight gain is noticed over previous weeks in the demand for general machinery, and industrial building operations throughout that territory are bringing inquiries for about every line of equipment. In Milwaukee, as well as in several other parts of the country, a better demand is coming from the export business, Canada and Mexico taking good quantities of equipment. It is predicted in Milwaukee that Wisconsin will soon be second only to Michigan as an automobile building State, but in that vicinity more attention is paid to the construction of commercial trucks than touring cars. The Western railroads are making inquiries in Chicago and they have marketed large bond issues there of late, a part of the proceeds of which are to be devoted to shop improvements. Milling machines are especially hard to get in that territory, and some of the leading manufacturers are several weeks behind in their deliveries. In the Central West only a fair business is being done and the demand is largely from small machine repair shops. Some good lists are expected in that territory, though, from machinery makers who are planning additions. In Detroit there are complaints of a slack market in some quarters. In the South business is little better than normal. Foundries, machine shops, boiler and tank making plants and other companies in the metal line are busy largely in recruiting and strengthening their equipment, rather than making large additions. In Pittsburgh some dissatisfaction is shown in the rising cost of materials and labor, and machinery houses there have increased prices, with the result that some business has been lost. On the north Pacific coast the machinery trade has been stimulated on both sides of the boundary by a good demand for general equipment, and in the Northwest a number of new hydroelectric propositions are occupying the attention of the machinery trade. Eastern capital is interested in developing a number of water power propositions in Minnesota, South Dakota and other Western States.

New York

NEW YORK, May 18, 1910.

The railroads continue to be active in the metropolitan territory, and, judging from the inquiries on hand, there are a number of Southern railroads which will shortly be buying in this territory. Most of the inquiries come for single tools, however, and they ask invariably for machinery for early delivery. This seems to indicate that the railroads are buying very cautiously and are taking only such equipment as they need for immediate use. There has been no buying against the list mentioned last week, but from all accounts orders will be placed by both the Pennsylvania Railroad and the New York, New Haven & Hartford in the immediate future. It is understood that the William Cramp & Sons Ship & Engine Building Company has completed the buying against the small list it has had before the trade here and in Philadelphia. The New York Central Railroad has placed a few orders for equipment mentioned in the large list of requirements a few weeks ago. Business from the general manufacturing trade has fallen off slightly, and if anything, conditions are rather quiet. The volume of inquiries is good, but actual orders placed in the New York machinery houses during the last week have not been large. There are some lines, however, in which business has been especially good of late. Makers of hot metal working machinery, such as bulldozers, forging equipment and the like, have been getting a good deal of trade which has come largely from the railroads or railroad equipment manufacturers. The mining machinery business continues especially good, and the export business in this line is quite large. A great deal of mining equipment has been sold for Mexico within the last few weeks, and activity in the iron ore districts in this country has given an impetus to the general mining equipment line. Manufacturers of small engines and electric units for apartment houses are doing well just now. The delayed spring building kept things rather quiet in this line until recently, but with the settlement of some of the labor troubles in the building trade a better demand has come up. The foundries are still rushed with orders for machinery castings, and machinery manufacturers find it rather hard in some cases to place their contracts. The foundrymen are loath to take orders because of some uncertainty as regards what they may have to pay for iron in the near future.

The New York, Westchester & Boston Railway Company, J. L. Crider, chief engineer, 63 Beaver street, New York, will open bids to-day for the construction of its roadbed. This is one of the largest contracts of its kind that has been let in this part of the country for some time, and it is understood that a large number of contractors are submitting bids on the work. It is stated that it will be necessary to handle between 3,000,000 and 4,000,000 cu. yd. of earth to

finish this roadbed, and dealers in contractors' supplies will no doubt be interested in obtaining the names of the successful bidders.

The Brazilian Government has awarded a contract to the Mead-Morrison Mfg. Company, 149 Broadway, New York, for the construction of new quays and docking equipment, including coal handling machinery, &c., at Rio de Janeiro. The contract calls for an expenditure close to \$15,000,000. It is understood that this company submitted plans for the proposed improvements to the docking facilities of the city and these plans were passed upon by a commission authorized by the government to act, and the formal authorization of the contract will be made shortly. Gen. F. A. de Souzaguar was sent by the Brazilian Government to this country to make the negotiations.

George H. Thatcher & Co., Albany, N. Y., manufacturer of gray iron and brass castings, has completed machinery purchases for recent improvements made to its plant. The company placed orders for a 5-ton traveling crane with the Case Crane Company, Columbus, Ohio; 150-ft. compressor with the Wickes Brothers, several molding machines with the Tabor Mfg. Company and Killings Molding Machine Company, and the purchases include a Millet core oven and a new brass furnace.

Contract for the construction of the roadbed for the Rome, Watertown & Ogdensburg Railroad, a branch of the New York Central lines between Lacombe and Adams, N. Y., has been let to the Sundstrom & Stratton Company, 90 West street, New York. Work is expected to commence at an early date.

The purchase of a modern high duty pumping engine is under consideration at Rome, N. Y., where the present equipment of the water works is inadequate to the service.

Among the public improvements to be made on the Island of Cuba this year will be a mechanical filtration plant with which to insure a pure water supply at Santiago de Cuba. Regarding the plans for this project, R. W. Pratt, director of sanitation, Havana, may be addressed.

The Buffalo Crushed Stone Company, Buffalo, N. Y., will install an alternating current motor of 250 to 300 hp. for driving a large rock breaker.

The Niagara Gypsum Company has decided upon some new electrical machinery for its plant at Oakfield, N. Y.

The Holley Mfg. Company, Buffalo, N. Y., has been given the largest order for high duty pumping engines ever awarded in a single contract. It comprises five vertical triple expansion units having an aggregate rated capacity of 150,000,000 gal. daily, to be installed in the new municipal water works at Buffalo.

The Colorado-Arizona Mines Company, with offices at 43 Exchange place, New York City, is completing a hydroelectric plant near Magnolia, Colo., and will install a motor driven hoist and air compressor.

The Machinery Markets

The Ashworth & Odell Worsted Company is building a plant at Salamanca, N. Y. It is understood that the best equipment of its kind to be obtained will be installed in this factory, which will be completed some time during the summer.

The Jamestown Shale Brick Company, Jamestown, N. Y., is making a large addition to its plant, and among the improvements will be sidetrack connections with the Erie Railroad.

Swift & Co. are building a large power plant in Jersey City, N. J., adjoining their packing plant. It is intended that the building will be completed and machinery installed before fall.

Kelly & Steinman, cut glass manufacturers, have purchased a building at Deposit, N. Y., which will be remodeled and equipped at an early date for the manufacture of its goods.

The Sterling Engine Company, Buffalo, N. Y., has completed the addition to its plant recently mentioned, and now has plans under way for some further buildings which will be erected during the summer.

The North Collins Shale Brick Company is building a plant at North Collins, N. Y., for the manufacture of paving and building brick. It is understood that most of the equipment has been provided.

The Ball & Wood Company, Elizabethport, N. J., states that the Illinois Steel Company has contracted for the installation of two 3000-kw. Rateau-Smoot mixed flow turbines, each to be directly connected to a 3000-kw., 25-cycle, 2200-volt, three-phase alternating current generator. These units are to be installed at the South Works, Chicago.

The Hagstrom Brothers Mfg. Company, Lindsborg, Kan., is inquiring in this market for automatic machines to make spark plugs, both $\frac{1}{2}$ in. and $1\frac{1}{4}$ in. sizes.

Chicago

CHICAGO, ILL., May 16, 1910.

Machinery dealers attach considerable importance to the fact that Western railroads have been successful recently in marketing large bond issues for improvements and equipment. It is believed that this will make a considerable change during the next month or two in the attitude of the railroads regarding the purchase of machine tools. While their investment in shop equipment represents only a small part of the total expenditures of the railroads, it is nevertheless a capital investment and the greater part of new purchases is charged to capital account. The large amount of new capital that will become available for expenditure will undoubtedly release business that has been held up for a long time in the purchasing departments of the roads. Meantime general business is jogging along in the Chicago machinery market. The automobile people have about exhausted their opportunities to buy milling machines and get deliveries in time for their 1911 business. The high class machines are sold up into the winter and even to next spring on some sizes, and there is a tendency among buyers of this class of tools to turn their attention toward the medium grades. While there are not many other lines of machine tools on which the product has been sold so far ahead, several manufacturers of lathes are getting behind on deliveries, and the railroads also find that they cannot get heavy boring mills for any near delivery. Several good inquiries are reported from the country towns around Chicago where new factories are being built, and inquiries seem to be generally a little better from manufacturing buyers.

The announcement that the Pennsylvania Railroad has issued a large list is received with considerable interest by Chicago houses. The Pennsylvania people generally mean business when they come into the market, and dealers have hopes that this inquiry will not prove a false alarm like other lists which have come out during the past six months.

Deere & Co., Moline, Ill., will commence work at once on an addition to their fitting shop which will cost \$90,000. The present shop is 56 x 300 ft., four stories, to which will be added a fifth story and an extension 56 x 300 ft., five stories. The first two floors will be used for the fitting shop and the three other floors for the cultivator department. A one-story corrugated iron building is being razed to make room for a modern eight-story factory building, 80 x 240 ft., which will cost about \$175,000. This new building will contain 175,000 sq. ft. of floor space. There has also been ordered an addition of a fifth story to three four-story buildings, giving 50,000 sq. ft. more of floor space. The company proposes to erect in the coming three years many new buildings, at the end of which time the capacity of the

mammoth plant will be more than doubled. The work of constructing the new buildings has been so planned that the output of the shops will not be interfered with.

The Moline Plow Company, Moline, Ill., is preparing to build a new plant to manufacture pumps and gasoline engines. The main building of this plant will be 240 x 340 ft. A foundry building 128 x 150 ft. will also be erected. The company has also announced that it will expend \$500,000 in rebuilding the plant of the Mandt Wagon Company, Stoughton, Wis., a subsidiary concern. While work on the reconstruction will be commenced at once, manufacturing operations will not be suspended. The new plant will consist of eight buildings of fireproof construction. A blacksmith shop, 152 x 182 ft., will be the first building erected, and as soon as it is completed the present blacksmith shop will be razed, giving ground space for another building. By this method it is possible to keep all departments in operation while the new plant is being erected.

The Freeport Casket Company, Freeport, Ill., has been organized with a capital stock of \$100,000. The company will erect a factory building 100 x 200 ft., together with power plant, dry kiln and other necessary buildings. In the main building there will be installed a complete line of wood-working machinery which will be operated by electrical power. Details of power equipment as well as other machinery to be installed have not been completed as yet.

The Ingalls-Shepard Forging Company, with offices located in the McCormick Building, Chicago, has been incorporated, with capital stock of \$120,000, to do a general line of drop forging work. The company is erecting a plant at Harvey, Ill., which it expects to have in operation the latter part of this month. F. A. Ingalls is president and treasurer; Charles C. Shepard, vice-president, and W. S. Weston, secretary.

The Voss Brothers Mfg. Company, Davenport, Iowa, has plans drawn and will commence work in the near future on the erection of a new washing machine factory 75 x 188 ft. All machinery to be installed in the new plant will be operated by electric motors.

England Brothers, Marshall, Mo., will remove their plant to Boonville, Mo., where they expect to be ready to begin the manufacture of harrows by June 20.

Sundberg, Kropp & Co., Chicago, have recently made improvements to their plant which include the installation of a new 6000-lb. Niles-Bement-Pond steam hammer, two large heavy duty Niles-Bement-Pond lathes, three new boilers with sand bottom furnaces, and Jones underfeed stokers. The firm has also acquired a tract of ground adjacent to its shop which it will use for storage purposes.

The Monarch Tool & Machinery Company, Chicago, has been incorporated, with capital stock of \$5000, to manufacture and sell tools and dies. The incorporators are Joseph J. Dohes, Ben Jelinek and John F. Kythica.

The Deere & Mansur Company, Moline, Ill., has awarded a contract for the erection of an addition to its blacksmith shop 50 x 170 ft.

The Sandusky Portland Cement Company, Syracuse, Ind., has ordered some additional motors for operating machinery.

Dealers here expect to figure on a new motor driven pump for public water service at Plymouth, Ind. An elevated steel tank may also be required there.

A three-story addition, 75 x 120 ft., will be made to the factory of the Commercial Furniture Company, Chicago.

The Crane Company, Chicago, is preparing to put up its new four-story factory building, 110 x 110 ft., on Canal and Judd streets, Chicago.

A three-story woodworking plant, 60 x 100 ft., will be built in Chicago by the Original Mfg. Company. It represents a remodeling. The Simpson Construction Company has the building contract.

The Moline Malleable Iron Company, St. Charles, Ill., is meeting with a large demand for its detachable drive chain on the North Pacific Coast, where it is represented by the Pacific Machinery Company, Portland, Ore.

The Western Shaw Block Company, whose offices are in the Royal Insurance Building, Chicago, has put on the market a new type of concrete block machine. This is being manufactured at present under contract, prior to the building of a plant.

The city of Decatur, Ill., will issue bonds for a \$75,000 electric lighting system to take the place of one recently burned. D. W. Mead is consulting engineer, 401 State street, Madison, Wis.

W. M. Barth, 303 Woolner Building, Peoria, Ill., is in the market for four or five second-hand shears for cutting busheling scrap and heavier iron.

The plant of the McIlroy Belting & Hose Company, Hammond, Ind., was destroyed by fire May 13.

The Globe Stove & Range Company, Kokomo, Ind., has largely increased its plant and has installed a Newton cupola of 14 tons hourly capacity and an outfit of ladles and trucks

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for industrial railway, all furnished by the Northern Engineering Works, Detroit.

The Peoria Drill & Seeder Company, Peoria, Ill., will build a plant, 60 x 240 ft., two stories, instead of a plant 200 x 600 ft., as was mentioned last week.

Beall Brothers, Alton, Ill., part of whose factory was burned recently, have made preparations for rebuilding, and expect to have this part of its plant in operation within 60 days. An addition to the shovel factory has just been completed which doubles the capacity of the plant.

The Power Specialty Company, 111 Broadway, New York, has removed its Chicago office from The Rookery to the People's Gas Building to secure better accommodations for handling its increased business. The office is in charge of R. B. Nutting, manager, and R. H. Wyld, assistant manager. The volume of Foster superheater sales is increasing rapidly, the contracts secured so far this year nearly equaling the total of last year's business.

Philadelphia

PHILADELPHIA, PA., May 17, 1910.

The closing up of some deferred business and a slightly better volume of day-to-day orders, together with a noted increase of inquiries, including a list for a considerable number of tools for the Maryland Steel Company, has given the market a somewhat better tone. There is nothing, however, to indicate that there has been a definite turn for the better in the demand, as there is still a strong disposition apparent on the part of many prospective buyers to await further developments before placing orders. The general situation is still spotty, although there is undoubtedly a feeling that better conditions are not far off. Sellers in this territory have not been extensively favored with inquiries in connection with the Pennsylvania Railroad's requirements for shops west of Pittsburgh, the bulk of the railroad inquiries before the trade here being of a small and miscellaneous character. Shipbuilding is showing increased activity, the letting of contracts for building of some six vessels to shipyards in this district is of interest to makers of equipment required in their construction. Locomotive builders report fair orders, but note a decrease in inquiries. Extensive additions to textile plants, general manufacturing buildings, &c., indicate a continued demand for power equipment.

The joint convention of the National Supply and Machinery Dealers' Association and the American Supply and Machinery Manufacturers' Association at Atlantic City during the week was given considerable attention by the local trade, and many who were in attendance state it was a most satisfactory convention.

The Maryland Steel Company has sent out inquiries from its Philadelphia office in the Franklin Building, for equipment for its Sparrows Point, Md., plant. The following tools are included: Two planers, 9 x 30 ft., four radial drills, one 60-in. boring mill, one slotter, one 7 x 24 ft. planer, brass lathes, one vertical milling machine, one 40-in. planer, four turret lathes, one pipe threading machine, one 36-in. lathe and several special planers.

An inspection of the yards of the Philadelphia & Reading Railway at Coatesville, Pa., has been made by officials of the company with a view, it is reported, of making extensive improvements to facilitate the handling of traffic, which has for sometime been very much congested at that point. Owing to peculiar conditions at this location the Reading Railway is required to handle, in addition to its own traffic, that of the Pennsylvania Railroad in connection with the several steel works at Coatesville.

The William Steele & Sons Company has contracts for the erection of a five-story concrete manufacturing plant, 43 x 100 ft., to be built for George W. Blabon, oil cloth manufacturer, on Blabon street north of Hunting Park avenue, also for a seven-story manufacturing building, 76 x 138 ft., to be built for the Roxford Knitting Company at Randolph and Jefferson streets. This building will also be of concrete construction.

The Baldwin Locomotive Works has recently booked orders for 10 locomotives for the Norfolk & Western, 22 for the Iowa Central and 10 for the Chicago & Alton Railroad. The Baldwin concern now has over 14,000 employees on its payroll and is quite busy, although inquiries are reported as being lighter than some months ago. The election of a successor to the late president of the company, John H. Converse, will not take place for several weeks.

Ballinger & Perrot, engineers, have contracted with the J. S. Rogers Company, Moorestown, N. J., for building three additional stories, 80 x 100 ft., to the office and laboratory of the Victor Talking Machine Company, Camden, N. J. The present building is of reinforced concrete, four stories high, the addition conforming in general design and construction. Work is to be started at once.

The Fischer Machine Company, Race and Camac streets, will remove during June to new quarters at Eleventh, Wood and Pearl streets, occupying the first floor and basement. The building is of concrete, 72 ft. square, and particularly adapted for the company's requirements, having plenty of light on all four sides.

The Wm. F. Read & Sons Company has awarded a contract to John G. Brown for a five-story reinforced concrete factory building, 40 x 200 ft., to be erected at Twelfth and Jackson streets. On completion the building will be used for the weaving of dress goods, considerable machinery for which purpose is to be installed.

W. W. Steppacher & Brother, shirt manufacturers, will erect a five-story annex building at 1304-1306 Race street. The contract for the building has been let, but that for the power plant and elevators is yet unclosed.

The Philadelphia Electric Company is preparing to erect a reinforced concrete power house, 80 x 150 ft., at 2011-2037 Raustead street, on a site formerly occupied by the Brush Electric Light Company.

J. E. & A. L. Pennock, contractors, are estimating on a freight car shop 80 x 500 ft., to be built in Oswego, N. Y.; also on a car shop 200 x 350 ft., to be erected for the New York Central & Hudson River Railroad at Avis, Pa.

Hunter & Dixon have purchased property 40 x 150 ft. on Swanson street above Washington avenue, adjoining their present warehouse, which will be used for pipe storage purposes.

The Economy Iron Works, Fifth and Pusey streets, Chester, Pa., has been incorporated under the laws of the State of Delaware with a capital of \$150,000. The concern manufactures boilers, stacks and general tank work. The organization of the new company has not yet been completed.

The contract for improvements and new buildings for the State Sanitarium, near Mont Alto, Pa., for the State of Pennsylvania, has been divided between Charles W. Denny, builder, of this city, and a New York company. The cost of the entire work will be \$212,000.

The Philadelphia & Reading Railway has filed plans with the Bureau of Building Inspection for a one-story power plant, 120 x 125 ft., designed by its own engineers, to be built on Pier 14, Port Richmond Wharves.

Cincinnati

CINCINNATI, OHIO, May 17, 1910.

Business in machinery and machine tool circles in this market is normal. Inquiries are said to be fewer, but the tone of those received is encouraging to manufacturers. Practically all machine tool builders in this territory are busy with orders booked earlier in the year. Manufacturers of boilers and engines and of some of the heavier lines of machinery are a little apprehensive at not receiving enough orders to insure running on full time during July and August, but it is the general opinion that they are wrong in entertaining such ideas. The majority of boiler makers are working on full time and have enough business booked to keep them busy five or six weeks. Grinders and portable electric tools seem to be in fair demand, and the manufacturers of the last named line are very well satisfied. Milling machines are still the leaders and sales of the more modern upright and radial drills are keeping up the good record of the past few months. This is particularly true of the heavy duty uprights, and orders have been received for these tools from practically all parts of the country. Manufacturers of valves and engineering specialties report business fair, with some scattering orders from Europe and the South American countries.

The Columbia Iron Works Company, Cincinnati, will furnish the iron and steel used in the new factory to be built for the Hisey-Wolf Machine Company at Colerain and Marshall avenues, Cincinnati. The architect and superintendent, Harry Hake, began work on the structure May 16, and it is expected to be ready for the company's occupancy some time during August. The building will be of reinforced concrete construction, two stories, and will cost about \$25,000.

A number of Cincinnati manufacturers of machine tools are considering the feasibility of exhibiting their products at the Industrial Exposition, to be held in Turin, Italy, from April to October, 1911.

The new addition to the foundry department of the William Powell Company, 50 x 200 ft., two stories, of reinforced concrete, is going ahead at once under the superintendency of Architect Gustav Drach.

Dayton, Ohio, is working to secure the new factory of the Mead Engine Company, which has just been incorporated by Cyrus G. Mead, Adam Schanze, Edward G. Pease, R. R. Dutch and Carroll Sprigg of that city. Mr. Mead, most prominent in the organization, is the inventor of a new engine for automobile installation. He is the secretary of the Cit-

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izens' Electric Company of Dayton, which he promoted. A million dollar plant is to be built, to give employment at the start to 1000 men, with the expectation of doubling this force in time.

James M. Sprague, W. S. Diggs, C. J. McDiarmid, O. P. Cobb and B. T. Hatchett have incorporated at Cincinnati the Ohio Vending Company, to manufacture a new automatic vending machine. The capital is \$10,000.

With the incorporation of the Cincinnati Union Depot & Terminal Company by Lewis Seasongood, Archibald S. White, Louis J. Hauck, F. R. Williams and C. R. Matthews, signs of active work in behalf of a new Union Depot and terminal facilities begin to accumulate. Plans are already drawn for a large building to cost several millions.

L. E. Ewing, Cleveland, Ohio, is reported to have purchased the plant of the Findlay Axe & Tool Company, Findlay, Ohio, from the receiver, J. E. Bicknell, for \$6500. Mr. Ewing, who is owner of the Ewing Taxicab Company at Geneva, Ohio, has not as yet verified the report that the Findlay factory will be remodeled to suit the demands of an automobile building plant.

The Farrell-Cheek Steel Foundry Company is the name of a new corporation at Sandusky, Ohio, with a capital stock of \$50,000. The incorporators are H. Farrell, Harry Rimel-spach, L. K. Burge, A. V. Brown and C. E. Mason.

Cleveland

CLEVELAND, OHIO, May 17, 1910.

Machinery dealers report a fair volume of business during the week. The demand is better than during April, and the general outlook somewhat more satisfactory. Nearly all the orders that are coming out are for small lots of tools. Some good inquiries that recently came into the market are still pending. A large share of the business being placed with dealers is still coming from the makers of automobile parts and accessories. New manufacturing plants for making automobile parts or accessories are starting up from day to day, and many of the existing ones are adding to their equipment and capacity. The demand that comes direct from the automobile trade is still light, but reports indicate that some of the manufacturers will soon make their purchases for 1910 requirements. The fact that deliveries on the class of tools used most extensively by the automobile people are still far behind will cause them to get in their orders as early as possible.

The demand for second-hand tools is very good, but the supply is remarkably scarce. Makers of heavy handling machinery report a fair volume of orders coming out and inquiries quite plentiful. The call for electrical equipment for manufacturing plants is very good. While most of the inquiries are for small generators and motors, some large contracts are in prospect.

Conditions in the metal working industries in this territory are generally satisfactory, although not uniform. Some plants are crowded with work and report that orders are as numerous as at any time during the past few months. Among others there has been a falling off in new business, but production has not been curtailed, as these plants are working on old orders.

The local foundry situation has been unsettled for several weeks because of the demands of the molders and coremakers in the heavy union shops for an advance in wages. This trouble has been adjusted and the outlook is now more favorable. Pending a settlement the foundries held off as much as possible from making contracts for future delivery. The demand for light castings continues good and local foundries are well filled with work.

Through the efforts of the Sandusky Business Men's Association, Sandusky, Ohio, a new manufacturing plant will be erected in that city by a company that has just been organized under the name of the Sandusky Auto Parts & Truck Company. The contract has been let to the Muncie Bridge Company, Muncie, Ind., for a fireproof building, 60 x 400 ft. The plant will be located on First street. The construction work will begin at once, and it is expected to have it in operation within six months. Daniel E. Storms is secretary of the new company.

The Burt Mfg. Company, Akron, Ohio, reports that the demand for ventilators is very satisfactory and that its plant is well filled with work. Among the larger orders recently received by the Burt Company are the following: Thirty combination skylights and ventilators for the Lone Star Cotton Mills, McKinney, Texas; 12 48-in. ventilators for the Savannah Electric Company, Savannah, Ga.; 12 30-in. ventilators for the New Jersey Zinc Company; 18 20-in. ventilators for the Atlantic Terra Cotta Company, Perth Amboy, N. J.; five 48-in. ventilators for the Ohio Salt Company, Wadsworth, Ohio, and five 48-in. ventilators for the Detroit Can

Company, Detroit, Mich. The Burt Company recently received its thirty-ninth order for ventilators from the U. S. Steel Corporation and its thirteenth order from the Standard Oil Company.

The Moore Heating & Mfg. Company, Akron, Ohio, announces that it has acquired the Barberton steel foundry plant, Barberton, Ohio, and is negotiating for the factory of the Hist Mfg. Company in Barberton, to be used as its plant for the manufacture of stoves and heating furnaces. The company will buy machine tool equipment, including lathes, grinders, milling machines, presses, &c.

The W. S. Tyler Company, Cleveland, maker of ornamental iron bronze and brass, has purchased property adjoining its present plant, with the view of eventually making further additions. It is announced, however, that nothing will be done in that line during the next few months.

The Crescent Brass Mfg. Company, Cleveland, has been incorporated with a capital stock of \$10,000 by Charles H. Hofrichter, William J. Luck, J. W. Bowles and others, to engage in metal spinning and the manufacture of artistic brass products. The new company will take over the business of L. A. Weber & Co., 2162 East Fourth street. Mr. Hofrichter will be the manager.

The Champion Machine & Forging Company, Cleveland, will enlarge the capacity of its plant by the installation of considerable new machinery. Four new hammers and other machinery have been ordered. In order to provide for the expansion of its business, the company has increased its capital stock from \$50,000 to \$125,000.

The Gas Engine Appurtenance Company, Cleveland, has been incorporated with a capital stock of \$10,000 by Andrew B. Nichols, Edward H. Sherburne and others. The company states that for the present it will not engage in manufacturing.

The Wright Wrench Mfg. Company, Canton, Ohio, has changed its name to the Wright Wrench & Forging Company.

The property of the Miller-Tyson Company, Canton, Ohio, was offered for sale last week as the result of bankruptcy proceedings. The high bid, \$18,010, was made by the Miller Pasteuring Machine Company. This includes the machinery, patterns, patents and other personal property.

The West Steel Casting Company, Cleveland, Ohio, is making further additions to its plant, and will install new machinery to increase its output of crucible and converter steel castings.

The Ohio Tractor Company, Marion, Ohio, maker of gasoline engines, has purchased the old plant of the Marion Mfg. Company and will continue to operate in Marion. This company was referred to in our issue of May 5 as the Marion Tractor Company instead of the Ohio Tractor Company.

The Mount Vernon Railway & Light Company, Mount Vernon, Ohio, which operates a power plant of 600 kw., engine driven, will erect a new generating station of considerably larger capacity.

It is stated that the Bunting Brass & Bronze Company, Alliance, Ohio, has under consideration plans for a new foundry building.

The Cincinnati, Hamilton & Dayton Railroad will install on its docks at Toledo, Ohio, a rotary converter of 600 to 800 kw. and other apparatus, including a direct current generator with equalizing flywheel, similar to one already operated there by the Toledo & Ohio Central Railroad. This is a new type of machine intended to keep the load on the power plant constant where hoists and other machinery are intermittently run.

From Wrightsville, Pa., it is reported that the Capital Gasoline Engine Works is having plans drawn for a new plant, which may be located in another city.

A machine and forge plant will be erected this summer in connection with the factory of the Adams Husker Company, Marysville, Ohio.

The Dodge Mfg. Company, Mishawaka, Ind., has recently purchased several Swartwout cast iron exhaust heads, made by the Ohio Blower Company, Cleveland, Ohio.

The Toledo-Massillon Bridge Company, Toledo, Ohio, announces that business in its crane department has far surpassed its expectations. Orders have been placed with it by some of the best concerns in the country; prospects are exceedingly good, and a very large crane business is expected for the year. Actual buyers are numerous, orders are being placed without hesitation, and general conditions seem better than at any time heretofore. Numerous improvements have been made in the plant, and a large addition has been made to the machine shop, which has been equipped with the most modern tools. Sales of cranes for the past three months have covered quite a wide range of territory, among the buyers being the following: Nashville Bridge Company, Nashville, Tenn.; Oliver Chilled Plow Works, South Bend, Ind.; Enterprise Foundry & Fence Company, Indianapolis, Ind.; Portsmouth Machine & Casting Company, Portsmouth, Ohio; Lunkenheimer Company, Cincinnati, Ohio; Buckeye Steel Castings Company, Columbus, Ohio; Laidlaw-Dunn-Gordon Company, Cincinnati, Ohio; Erie City Iron Works,

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Erie, Pa.; Cadillac Machine Company, Cadillac, Mich.; Upson Nut Company, Cleveland, Ohio; Allis-Chalmers Company, Milwaukee, Wis.

The Blint Lubricator Mfg. Company has located on the Erie tracks at Ashland, Ohio, and is now building a plant which will be used for the manufacture of lubricating apparatus.

New England

BOSTON, MASS., May 17, 1910.

The machinery dealers of this territory are having a variety of experience, some reporting a very satisfactory business as compared with March and April, while others find trade falling off a little. May will not be the usual record month of the year, taking the trade as a whole, unless the closing fortnight shows surprising gains. Manufacturing in general is holding its own, so far as can be learned.

The Excelsior Hardware Company, Stamford, Conn., is erecting a new factory for the manufacture of special cabinet and trunk locks and hardware specialties. This is a new corporation having a Connecticut charter and a capital stock of \$25,000. Elisha Mix is the president and treasurer, James E. Mix secretary and Moseley W. Mix superintendent. The office is at 65-67 Walnut street.

The S. W. Card Mfg. Company, Mansfield, Mass., manufacturer of taps, is building a four-story brick addition to its factory, 60 x 100 ft., which will be used for manufacturing.

The Sand Blast Company, New Haven, Conn., has been organized under a Connecticut charter, with capital stock of \$35,000, to manufacture a new combination tumbling barrel and sand blast, the invention of Charles A. Dreisbach of the C. A. Dreisbach Foundry & Machine Company of that city. At present the machines are being built at the Dreisbach works.

The Marlin Firearms Company, New Haven, Conn., has purchased the business of the Ideal Mfg. Company of that city, manufacturer of reloading instruments for rifles, shotguns and pistols. The sale includes the entire mechanical equipment of the company. John H. Barlow, founder and head of the Ideal Company, retires, but his assistant manager, Joseph A. Derby, remains in charge of the new branch of the Marlin Company.

Additions planned for general manufacturing plants include the following: A. L. Blackmer Company, New Bedford, Mass., cut glass, factory 26 x 100 ft., three stories; Indian Orchard Company, Indian Orchard, Mass., mill, 45 x 198 ft., three stories; Derby Rubber Company, Derby, Conn., addition 40 x 80 ft., together with additional story to existing building.

The Athol Machine Company, Athol, Mass., whose works have been running very light for some time past, will start up at full capacity as soon as a force of workmen can be gathered together. Manufacturing facilities will be increased. The company is not yet ready to give the full list of machinery which will be required, but it is now in the market for sand blast equipment and annealing ovens for castings. The company manufactures vises, grindstone frames, American meat choppers, machinists' tools and hardware specialties. It will continue all of the old lines and will add others as soon as things are in shape. It will also do light job work in the foundry.

The New Britain Machine Company, New Britain, Conn., will erect an additional building, which will be 60 x 130 ft., five stories, with the purpose of extending its business. A new power house will also be built and power facilities increased, and a traveling crane will be installed.

The Springfield Foundry Company, Springfield, Mass., will establish a new plant in the suburb of Indian Orchard, which will be under the management of Richard D. Reed, until recently with the H. B. Smith Company, Westfield, Mass. The new foundry will manufacture a line of heating boilers, a new department for the Springfield Company, and will also do jobbing work. It will be 130 x 155 ft. and its site is a tract of 10 acres of land on the main line of the Boston & Albany Railroad. Work will begin immediately and the foundry should be ready for occupancy by August 1.

The Ready Tool Company, manufacturer of lathe tool holders, has removed its business from New Haven to Bridgeport, Conn., where a building has been leased. The work of installing machinery is practically completed.

Beaure Bros., Franklin Falls, N. H., proprietors of the Franklin Foundry, will erect a new foundry which will be in operation next fall, and have taken a building formerly occupied as a brush factory and will equip it as a machine shop.

The New England Gas & Coke Company, Boston, Mass., has plans for the establishment of a blast furnace in Chel-

sea, to cost \$1,500,000, to smelt Cuban iron ore. The project is dependent, the company states, upon the passage of certain legislation having to do with the dredging away of mud flats now the property of the United States Marine Hospital.

The Parker Transmission & Appliance Company, Springfield, Mass., manufacturer of transmissions for motor vehicles, machine tools and other machinery where changes of speed are required, is planning to build and equip a large manufacturing plant in Springfield within the next year or 18 months. The business is a new one, with present quarters in the upper story of the Waltham Watch Tool Company's building, where between \$30,000 and \$40,000 worth of machine tools are now being installed, to constitute a tool room equipment with which to get jigs and fixtures in shape for manufacturing at a later date. An effort has been made to get the industry for London, England, British capitalists having become interested, but it has been decided to remain in Springfield. Inquiries already made in the trade by the company indicate that later purchases will be on a very large scale. Prominent Massachusetts and Connecticut capitalists are behind the project. The great future for the transmission, it is held, is in automobile construction, but the machinery end should not be a small one. Clarke W. Parker, the inventor of the device, is the president of the company, James H. Dunn, treasurer, and John F. Malley, secretary.

The Willimantic Machine Company, Willimantic, Conn., manufacturer of silk and thread machinery, has begun the erection of a new shop, 50 x 226 ft., three stories, and a boiler house 18 x 40 ft. The company states that it will require no new machinery at this time.

The Star Mfg. Company, Providence, R. I., has been incorporated in that State to manufacture gold, aluminum and imitation gold leaf in rolls; bronze powders and manufacturers' metals. The capital stock is \$100,000. The incorporators are Charles E. Smith, Charles H. Bowers and William M. Towne.

Work is progressing rapidly on the new shop of the Windsor Machine Company, Windsor, Vt., and it will be ready for occupancy in the summer. The building is 130 x 584 ft., one story, with saw tooth roof. At one end of the structure is an ell for a boiler house 40 x 50 ft., and there is a toilet room 22 x 84 ft. At the boiler room end of the main building will be the engine room and forge shop, the next lateral section will be given over to the stock room, while the remainder of the structure will be occupied as the machine shop. The grouping of machinery will be of unusual interest. A 10-ft. aisle will extend the length of the shop on the center line, while the great room will be divided into lateral bays, with machinery arranged so the transfer of work in process will be consecutive. For example, the battery of planers will be the same bay and served by the same crane as the boring mills and radials, to which the work goes from the planes. As the work is comparatively light no power cranes will be needed, hand cranes and chain hoists being employed in each bay. A spur track from the Boston & Maine Railroad runs to a long loading platform, serving the stock room and boiler room end, and also the other extreme of the building where completed machines will be loaded. Power will be supplied by boilers giving 800 hp. and a 750-hp. engine.

Pittsburgh

PITTSBURGH, PA., May 17, 1910.

Trade for the past week has held up very well, and the average run of buying is of a character to encourage the expectation that orders from the same sources will continue to come in. Some dissatisfaction lies in the fact that, with rising cost of materials, labor, freight, &c., prices for finished machinery remain on such a low level. In certain lines, also, there has been sharp competition, leading to concessions on the part of zealous salesmen which have had a bad effect on subsequent negotiations. There is need of a getting together more frequently in friendly discussion of manufacturers and dealers interested in the same lines of selling. The fact that there have been so few cancellations this season, except for good cause, is one indication of the feeling among buyers that their purchases have been made on terms favorable to themselves.

Quite a number of the smaller metal working plants of western Pennsylvania, Ohio and Indiana have privately announced the intention of abandoning their present situations in favor of nearby sites more advantageously placed with respect to raw materials or markets, or in which skilled labor is more readily obtainable. Others are openly looking for new locations. The ultimate effect of this migratory tendency, particularly as it portends a more rapid readjust-

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ment of industrial groupings than in former years, is not to be overestimated, although at present its influence is felt mainly in stimulated buying of new tools and an increase in offerings of second-hand machinery.

It is reported that the Baldwin Forging & Tool Company, Columbus, Ohio, will establish another plant at Charleston, W. Va.

The extraordinary activity in water works construction and extension all over the country has crowded the works of the Pittsburgh Meter Company in East Pittsburgh, Pa., with orders for every type of meter used. A feature of the trade is the growth of the demand for apparatus to be used in connection with large, swiftly flowing volumes of water, as the influence of exact measurement and records in determining the economy of industrial operations where water is required, as in ore construction, mill service, &c., is coming to be better appreciated.

New equipment ordered by the Erie Forge Company, Erie, Pa., includes an engine driven generating set of 175 kw. capacity, to furnish direct current for operating motors in the works.

The Salisbury Light, Heat & Power Company, Salisbury, Md., which has in service a steam power plant of 400 hp., is rearranging the machinery. A new Corliss engine will be installed and belted to the main line shaft from which electric dynamos are driven.

The Vulcan Soot Cleaner Company, Pittsburgh, Pa., whose works are at Du Bois, Pa., is among the concerns of this district that have found trade good all through the season. It manufactures cleaners for boilers of all types and other apparatus of a similar nature.

The Flickinger Iron Works, Bradford, Pa., is making a feature this season of a very compact type of air compressor, with gasoline engine as an integral part of the unit.

At Charleroi, Pa., the city will install a new pumping unit and also a filtration plant. The municipal station is to be enlarged.

Bids for water works construction and material, including one or more large pumping units, will be taken by the Board of Public Service, Clarksburg, W. Va., about May 23.

The Grasselli Chemical Company is building a new plant at Meadowbrook, W. Va.

The Fort Pitt Malleable Iron Company, Pittsburgh, will install a small direct current generator, driven by a motor mounted on the same base. The order for the unit has been placed.

The Security Cement & Lime Company, Security, Md., will add to its facilities for circulating water a rotary pump driven by a Kerr steam turbine.

The Armstrong Electric Company, Kittanning, Pa., will install an alternating current generator unit of 150 kw. and other machinery in one of the plants of that vicinity.

The Wildwell Lumber Company, Wildwell, W. Va., has put its mill in excellent operating condition this season and may make provision shortly for a larger output, involving the purchase of some new machinery.

The Turner-Friche Mfg. Company, Pittsburgh, builder of gas engines having improvements that permit them to be regulated closely for lighting purposes, is now operating its new plant at Sharon, Pa., to partial capacity. Some of the orders in hand include gas engines of 150 hp., to be direct connected to 100-kw. generators, alternating current, and to be operated in parallel; 100-hp. engine for direct connection to 75-kw. direct current generators, and smaller units. Prospective business and orders about to be closed will enable the company to employ additional workmen shortly.

The L. A. Green Company, 419 Park Building, Pittsburgh, dealer in machinery, rails, contractors' equipment, &c., has purchased the complete equipment of machinery in the plant of the Ambridge Planing Mill & Lumber Company, Economy, Pa., consisting of boilers, pumps, heaters, one 125-hp. Corliss engine, 50 different working machines, &c., which it will sell in whole or in part.

The Bessemer Gas Engine Company, Grove City, Pa., has established an office in the Citizens' Bank Building, Cincinnati, Ohio, in charge of P. C. Benedict.

The United States Stamping Company, Moundsville, W. Va., intends erecting two additional buildings, one 120 x 160 ft., three stories, and another 100 x 200 ft., two stories. These buildings will be used principally by the warehouse and shipping departments.

The Wm. B. Scaife & Sons Company, Pittsburgh, reports an unusually large volume of business in water softening and purifying systems. Among some of its recent orders for the We-Fu-Go system are the following: American Sheet & Tin Plate Company, Vandergrift, Pa., 15,000 hp.; River Furnace & Dock Company, Cleveland, Ohio, 6000 hp.; New York & New England Cement & Lime Company, Hudson, N. Y., 8500 hp.; Spencer, Kellogg & Sons, Buffalo, N. Y., 1500 hp.

Detroit

DETROIT, MICH., May 16, 1910.

Dealers in machine tools are having what appears to be a satisfactory volume of business, although some complaints of a slack market are heard; and manufacturers, so far as can be learned, feel that business is about as good as they have any reason to expect at this time of the year. With the approach of summer, however, there has come an air of listlessness which is hard to dispel; so that one finds more difficulty than usual in getting at the real facts of the situation. One thing is undeniably clear. Shops everywhere through this section have an abundance of work for months, and many more skilled machinists could be used in the various plants than are now obtainable.

Considerably less is heard than heretofore of lists submitted by motor car builders; and the trade, as recently predicted, seems to be working more into general lines of machinery manufacturing, where there has, of late, been somewhat increased buying. The automobile people have, however, by no means exhausted their present requirements. Some heavy purchases will need to be made between now and fall in order to provide for equipping additions or new plants known to have been decided upon. The electrical industries will share in this demand to a considerable degree, as practically all plans now include motor drive.

Great interest is being taken in preparations for the forthcoming convention of the American Foundrymen's Association, with its allied organizations; and delegates will be made to feel, from their arrival here on the eve of June 6, that the local motto, "In Detroit Life is Worth Living," cannot be considered an idle expression.

It is reported from Grand Rapids, Mich., that a local manufacturer by the name of William Powell will put up a new concrete factory, 60 x 160 ft. Corroborative details are, however, lacking.

The Advance Threshing Machine Company, Battle Creek, Mich., will put up a warehouse, with repairing facilities, at Aberdeen, S. D.

The Breitung Mining Company, Negaunee, Mich., has enlarged its machinery plant and put it in good condition for a heavy season's output of iron ore. Some additional equipment is likely to be required a little later on.

Funds for the construction of municipal water works will be provided early in the coming summer at Galesburg, Mich., and purchase of material, pumps, &c., is to follow shortly.

The Eureka Machine Company, Lansing, Mich., has put on the market a measuring machine for concrete aggregates, which is finding a great deal of favor among contractors.

The Miller Saw Trimmer Company, whose present address is Milwaukee, Wis., will close contracts this week on a new factory building at Alma, Mich. Machinery at present in service will be removed to the new location and some additional equipment ordered.

The James Brady Foundry Company, Thirty-fifth street and Ashland avenue, Detroit, has recently increased its plant and has installed its second three motor alternating current electric Northern traveling crane of 10 tons capacity, 41 ft. span.

The Port Huron Engine & Thresher Company, Port Huron, Mich., is finding one of its best markets this year on the Pacific Coast, where it is represented by Henshaw, Bulkeley & Co., San Francisco. Heavy steam rollers are in good demand there, owing to the general movement in that section towards effecting permanent road improvement.

Improvements to be made in the water works system at Marquette, Mich., will undoubtedly lead to the eventual purchase of a new pumping engine, although no action directly to that end has as yet been taken.

It is now certain that a large distillation and refinery plant, involving the installation of a large line of machinery, tanks and accessory apparatus, will be erected by the Northern Turpentine Company at Koss, Mich., not far from Marinette.

The Swift Motor Car Company of Canada, Ltd., with offices at Chatham, Ontario, has been incorporated for \$200,000. The charter of the company is very broad, but it is the present intention of the management to confine its business to the manufacture of marine engines and automobile parts and general foundry products. The company has purchased the plant of the Defiance Iron Works, which it has thoroughly overhauled and remodeled. Crucible steel casting furnaces are now in course of construction. A design for a new two cycle marine engine has just been completed which embodies a number of prominent features calculated to minimize the difficulties and expense of both manufacturer and user. The company has acquired the Canadian manufacturing rights for the Potts selective geared automobile transmission. The machine department of the plant will in all probability be doubled by fall in order to keep pace with the demands made upon it for automobile parts.

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for 1911 delivery. E. W. Potts is president; A. J. Kirchner, vice-president; Wm. A. Montgomery, secretary; J. F. Mount, treasurer.

The Everett-Metzger-Flanders Company, Detroit, continues to be a fairly steady buyer of machinery, including equipment for the application of power.

Morgan & Wright, Detroit, have in contemplation some extension of their manufacturing facilities, which will be likely to lead to important purchases of machinery later on.

The Lozier Motor Company has awarded the contract to A. Bentley & Sons, Toledo, Ohio, for the erection of its Detroit automobile factory at St. Clair Heights, Detroit.

Benj. Middleditch, Detroit, is in the market for an electrically driven blower and elevator, two motors for cleaning room and one for core room, also for core machines, sand mixers, tumbling mills, grinders and other foundry equipment for an addition to his plant now being constructed.

The Great Lakes Engineering Works, Detroit, Mich., is giving much attention to the manufacture of machinery for ice-making and complete refrigerating plants. It has recently taken a number of important contracts for the erection of such plants.

The Atlas Drop Forge Company, Lansing, Mich., having outgrown its present quarters, is having plans prepared for a new plant which will have a capacity much greater than its present one. The sizes of the buildings and equipment that will be installed have not yet been decided upon, but plans are expected to be completed at an early date.

The Detroit Wire Spring Company, Detroit, Mich., is completing the additions to its plant recently mentioned and now has plans under way for the erection of another building on Morrow street, which will be four stories and will have more than double the floor space of its present plant.

Baltimore

BALTIMORE, MD., May 16, 1910.

Machinery merchants note a decline in the volume of business transacted so far during the month, particularly when compared with that taken during the same period in April. The demand has been less urgent, not for machine tools alone, but also for equipment and materials entering into general industrial work. Some scattered business in tools, machinery, boilers and engines comes out, but the market lacks definite snap. Considerable work under way, in the nature of municipal betterments, results in a continued fair volume of business to supply houses for general contractors' materials. Quite a fair amount of new building work has been recently authorized, several large structural steel buildings are in course of erection, others have been contracted for, while bids have recently been opened for several additional ones. There has also been a good proportion of new work in concrete manufacturing buildings and warehouses. Manufacturers of machinery and special tools, while for the greater part actively engaged, have a fair amount of business on their books, but note a decline recently in the demand for various classes of equipment.

The Skinner Shipbuilding & Dry Dock Company has been awarded a contract for a new harbor police and fire boat for the city of Baltimore.

The T. C. Bashor Company has recently taken an order for two 100-kw. engines and generators and three 200-hp. water tube boilers to be installed at the Johns Hopkins University, in connection with extensive heating and ventilating systems which this company will install. The Bashor Company is fully engaged, but reports current business less active.

The United Engineering & Construction Company has been given the contract by the Board of Awards for the city of Baltimore for the building of the Jones' Falls sanitary intercepting sewer. This sewer will pass under the new station now being built by the Pennsylvania Railroad. The work is to be completed in 150 days, the cost being approximately \$84,000.

The Aumen Machinery & Supply Company reports a fair volume of business, confined, however, to no special lines. The demand for machine tools shows a slight falling off when compared to that of a month ago.

Levering Brothers are progressing slowly on their new foundry building at Monroe and Wicomico streets. They advise the necessary equipment has all been contracted for. The new plant is not expected to be in regular operation before the middle of July.

The Detrick & Harvey Machine Company has recently added the line of vertical boring mills, formerly manufactured by the Bausch Machine Tool Company, to its various products. The manufacture of these tools, in all the sizes formerly made, will be started at once.

The Chesapeake Iron Works has just taken a contract

for a car barn and office to be erected for the Capitol Traction Company, Washington, D. C. James M. Parsons is the contractor for the general building work. The Chesapeake Works has just completed extensive additions to its plant, which have been under way for nearly a year. The various improvements double its capacity and enable the concern to handle work of a heavier type than was formerly the case.

The Paper Mills Company will shortly begin the erection of a new factory on Wicomico street, between Stockholm and Scott streets. Plans were made by Jacob F. Gerwig, and it is stated the work of construction will be done by R. B. Mason, contractor.

It is said the lowest bid for the proposed new pumping station to be installed by the city of Baltimore on South street, near Pratt street, was made by the Noel Construction Company, Baltimore.

The Weather Proofing Nail Company, Baltimore, Md., is making additional machinery of its own design, which will increase its capacity for manufacturing Capnal Two-in-One weather proofing nails by one-third. Owing to the steadily increasing demand for its product, the company is considering the removal of its plant to larger quarters, which, however, will not be finally decided upon for several months.

The Gandy Belting Company announces that as it has obtained decisions from the United States Circuit Courts of Pennsylvania, Illinois, Ohio and New York, upholding its right to the sole use of the word "Gandy," it will in future omit the word "genuine" in connection with its belting and brand it "The Gandy Belt."

The Sewerage Commission of the city of Baltimore, Md., will take bids on May 25 for the construction of an extensive system of lateral sanitary sewers in what is known as District 19 A and other sewer work in District 19 B and 35, under what is known as Sanitary Contract No. 52. An aggregate of about 32,000 ft. of vitrified sewer pipe of various diameters, 1000 ft. of brick and concrete sewer and 16,000 ft. of house connections will be required.

The Baltimore Bridge Company has recently taken orders for about 1200 tons of structural work for Government hospitals at Portsmouth, N. H.; Chelsea, Mass., and Newport, R. I. This concern is now erecting the Fidelity Building, Baltimore, Md., and is shipping against orders for two bridges for the United Fruit Company, for the Costa Rica Northern Railway, Costa Rica, Central America. One, the Matina Bridge, has two 200-ft. spans, one 130 ft. and six 65-ft. spans; the other, over the Chirripo River, has one span of 225 ft. Material for these bridges, about 800 tons in all, was purchased abroad, the orders having been taken some time ago when structural shape makers were unable to promise satisfactory deliveries.

The Paper Mills Company, Baltimore, has decided to rebuild its plant at Frederick and Lombard streets. The new building will be 130 x 160 ft., two stories, and work is expected to commence on it at once. Further extensions are contemplated some time in the future.

Milwaukee

MILWAUKEE, WIS., May 16, 1910.

Market conditions here continue favorable, and there has been a slight gain, if anything, over the preceding week. The steady increase throughout this territory of industrial building operations, which are now fully as important as during the record-breaking period of last fall, is stimulating in a marked degree the demand for machinery of all classes. There has been no time in the history of this State when the local market was of more importance to Wisconsin manufacturers, and they seem to realize that fact, inasmuch as more than ordinary pains are being taken to cultivate and retain the trade of their neighbors. This is notably the case with reference to machine tools, power and electrical machinery.

At the same time Wisconsin industries are reaching out into every field the world over, and a good run of business here at home does not deter machinery builders from looking for profitable orders elsewhere. An indication of this may be found in the numerous announcements of new branch offices being opened or selling agents appointed by Wisconsin manufacturers in various parts of the United States, Canada and Mexico, as well as to a considerable extent abroad.

It is perhaps significant, also, that a greater percentage of sales representatives, than in former years, are working on a commission basis, particularly outside of the large cities. Two, at least, of the largest concerns here have found that salaried salesmen are much more expensive to maintain and do not bring in nearly as much business as trustworthy agents or exclusive dealers who have an interest in the business directly proportional to their volumes of sales. The difficulty in seasons past was to secure agents who

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were sufficiently reliable, and whose loyalty could be considered at all constant. Gradually, however, this condition has been worked out in a large number of instances to the satisfaction of all concerned.

It is predicted by local enthusiasts, and the idea has support from conservative interests, that Wisconsin is destined to become second only to Michigan as an automobile building State; but the undoubted tendency is for the bulk of the manufacturing to develop along the lines of commercial vehicles rather than pleasure cars. There are now quite a large number of concerns about the State that make a specialty of building motor wagons, trucks, delivery vans, &c., and more are preparing to enter the field. The requirements of this class of work are, of course, considerably different from those of the touring car or runabout manufacturers, and tool builders who wish to take advantage of the opportunities now opening up here for selling to firms establishing commercial vehicle plants will do well to study their needs. It does not necessarily follow that apparatus which is in demand at Detroit or Toledo will find favor in this State. Among the people who have gone into the motor truck business a considerable proportion are successful wagon builders, operating plants in that line, and their ideas of equipment are influenced accordingly.

It is reported from Beaver Dam, Wis., that the Beaver Dam Gray Iron Company will build a new foundry 80 x 200 ft.

Contract for the steel work of the new three-story building to be erected by the Racine Iron & Wire Works, Racine, Wis., has been let to the F. J. Greene Engineering Works.

The Nordberg Mfg. Company, Milwaukee, which is represented on the lower Pacific Coast by the Tracy Engineering Company, of San Francisco and Los Angeles, is getting an increasing share of the business in that territory as well as in the mining districts adjacent. Great activity in the remodeling and equipping of plants at present exists in the copper country of Arizona and New Mexico also.

In view of the strong attack being made upon the proposed municipal power plant for Milwaukee, it is of interest to note the announcement just published at Escanaba, Mich., to the effect that the lighting station operated by that city shows net earnings of \$12,451.98 for the first 11 months of the fiscal year closing April 30, on a valuation of slightly less than \$70,000.

An all-steel wagon for contractors' use is being manufactured at Grand Rapids, Wis., by the F. MacKinnon Mfg. Company, whose production thus far this year has broken all previous records.

The Chicago, St. Paul, Minneapolis & Omaha Railroad, according to a report from Madison, Wis., has applied to the State Railroad Commission for authority to build a line into Superior and through that city to St. Louis Bay, where an extension will be made and machinery installed to enable it to compete with the Great Northern and Northern Pacific in ore carrying and handling.

The Johnson Service Company's new factory, to be built at or near Milwaukee, will be devoted entirely to what is now one of the company's principal lines, namely, the manufacture of commercial automobiles and autotrucks, four times as many of which are being built this year as last. An effort will be made by one of the suburban manufacturing districts to have the plant located there.

The Logemann Bros. Company, Milwaukee, is manufacturing a powerful press for baling metal scrap.

A local engineering firm which addressed the Flint & Walling Mfg. Company, Kendallville, Ind., with an inquiry for quotations on well-drilling machinery, has been advised that its manufacture has been discontinued.

Chas. Skidd, Kenosha, Wis., whose address there is given as 117 Milwaukee avenue, will build a three-story factory, for which a steam generating plant of 150 hp., electric dynamo and some motors will be required.

It is stated locally, but without direct confirmation, that the Brand Stove Company, Milwaukee, is arranging to build a factory of much larger capacity than that now occupied. Plans, however, have not yet been drawn and the purchase of any new machinery has not been considered.

The present extent of the trade of Wisconsin manufacturers having plants of no more than moderate size, as compared with some of the great works here, to which allusion has been made in this report at various times, is illustrated in the fact that the E. B. Hayes Machine Company, Oshkosh, recently entertained representatives from Austria and Russia, natives of those countries, where its products are now quite largely sold.

As a result of the campaign for industrial development now being carried on at Sheboygan, Wis., by the Business Men's Association, an entirely new plant will be built at Sheboygan, Wis., across the railroad tracks from its present location, by the S. W. Miller Piano Company, instead of the addition recently referred to. This will in-

volve the redesigning of the equipment along the best modern lines and the purchase of some additional machinery.

John T. Jones, Iron Mountain, Mich., has secured control of the Spurr mine, which runs to a lean magnetic ore, and will put this through his new step process of furnace reduction, which includes pulverizing and concentration of the ore and nodulizing it in rotary kilns, like those of a cement plant, for further treatment.

The Wisconsin Automobile Radiator Company, Milwaukee, has been incorporated by Gerhard Aussem, 357 Western avenue, North Milwaukee, Wis., and others, to establish a plant for the manufacture of the motor car part named in the title. The capital stock is given as \$50,000.

The International Harvester Company will erect a large new warehouse, with some repair facilities, at Eau Claire, Wis.

Lutter & Gies, Milwaukee, who have a well-established business in the manufacture of shapers and other machine tools, recently incorporated for \$100,000 as the Lutter & Gies Company. This again gives rise to the report circulated some time ago that they will build a new plant, probably at West Allis, where so many other machinery builders and foundries are now locating.

The St. Cloud Mfg. Company, St. Cloud, Wis., has been dissolved.

The new foundry to be built at West Allis, Wis., by the Wehr Steel Company, Milwaukee, will be of reinforced steel construction, part brick and part concrete, 75 x 125 ft. It will be equipped with electric motor drive, current being supplied from a dynamo coupled to a gas engine.

An innovation in the training of engineering students and apprentices, such as are taking courses in the various local works, was brought about last Sunday, when 100 young men from the West Allis shops of the Allis-Chalmers Company were taken over the route of the Milwaukee Northern Railroad, shown the large gas engine power plant in operation and given an opportunity of inspecting all of the electrical equipment, including that contained in the substations. This practice, it is stated, will be continued, different industries being taken up one by one.

The I. Stephenson Company, Wells, Mich., is completing what will be the largest saw mill this side of the Pacific Coast, including four 12-in. band saws, two resaws and a rift machine or gang, together with power equipment and a long line of auxiliary apparatus.

A manufacturing plant 30 x 70 ft. will be built at 1043 Kinnickinnic avenue, Milwaukee, by the Battery Light & Power Company.

The John Schroeder Lumber Company, Milwaukee, will add another story to its hardwood flooring factory and may require some additional machinery.

A large transformer substation will be built by the Northern Hydro Electric Company, Green Bay, Wis., near its hydroelectric development at High Falls.

The lifting mechanism of the new bascule bridge which is being constructed for the Chicago, St. Paul, Minneapolis & Omaha Railroad at Cushings, near Portage, Wis., will be operated by a gasoline engine. The use of this type of bridge is new and in railroad practice in Wisconsin.

Work is about to begin at Racine, Wis., on a new three-story factory, 100 x 375 ft., for the Kelley-Racine Rubber Company, for which a large line of mechanical and electrical power equipment is said to be required.

Contracts for the erection of the Milwaukee Stamping Company's new plant at West Allis, Wis., to replace the one that burned, are now being let. The Downey & Kruse Company, Milwaukee, will install the heating system.

The Curtis & Yale Mfg. Company, Wausau, Wis., is reported to be building a large addition to its plant.

Barnett & Record, Minneapolis, have contracted for an extension of the Berwin Coal Company's dock at Superior, Wis., for which additional handling machinery is also to be provided.

A large new tool making department for the works of Fairbanks, Morse & Co., Beloit, Wis., will be provided for in a new building about to be erected.

The Consolidated Sheet Metal Works, Milwaukee, which was some time ago reported as contemplating a gradual enlargement of its manufacturing facilities, has increased its capital stock from \$50,000 to \$75,000.

The new industries committee of a local association reported late last week that for the first four months of the current year a total of \$2,130,000 had been invested in new industries on the south side of Milwaukee, a long list of which was given, with the specific amounts set opposite each. The capital stock of existing plants had been increased during the same period \$1,199,000. Only strictly manufacturing enterprises were included in the enumeration, and the item first named was based on the cost of buildings, machinery, &c., not on stock issues. The individual amounts invested averaged about \$70,000 each. This shows something of the extraordinary activity here, as other parts of the city, together with various suburbs, are also

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growing industrially at a rapid rate; and the factories which are now starting in with only moderate facilities will, in many cases, become large enterprises if the usual rule holds good.

The Monitor Auto Works, Janesville, whose removal to that city from Chicago was recently noted, has been well established in leased quarters, and it will probably be another year before a plant is built especially for its occupancy.

The Belle City Malleable Iron Company, Racine, Wis., has taken over the plant of the W. P. Brown Mfg. Company of that city, which it is understood will be improved by the erection of additional buildings.

The Michigan Hoop & Stave Company, Marinette, Wis., is planning the erection of another plant to be used in the manufacture of boxes and crates; but work on this will not begin for some time, possibly not until next spring.

The South

NASHVILLE, TENN., May 16, 1910.

Foundries, machine shops, boiler and tank making plants, engine builders and others representing the metal trades interests of the South are still busy on orders taken some time ago, interspersed with work requiring immediate execution. A further feature which has lately entered into buying is the more general accumulation at mills and factories of sufficient stocks of spares to avoid shutting down even a single machine for more than a very brief time as the result of the breaking of some part. Factory owners have come to realize that the best results cannot be looked for unless all of the machinery used is in a high state of efficiency; hence greater precautions are now being taken than ever before to insure prompt renewal of any broken or damaged piece. The same influence is leading to the installation of machine tools, grinders, forges, welding outfits, &c., as repair equipment in isolated plants where this was formerly not considered necessary. Taking all these things into consideration, it is predicted by those who are in a position to make extensive observations that the machinery requirements of the South for the year beginning September 1 will be at least 75 per cent. greater than the figures for the twelve months preceding would show and may go considerably higher.

The installation of pumping machinery for serving the community with water is under discussion at White Springs, Fla.

The Gibbes Machinery Company, Columbia, S. C., has had an excellent trade for some time among Southern mills and the prospects for future business of this class are good.

It is reported from Dyersburg, Tenn., that the North Vernon Lumber Company, North Vernon, Ind., contemplates establishing a timber cutting and veneer plant in that vicinity.

The Albany Power & Mfg. Company, Albany, Ga., which operates a hydroelectric power station of 1500 kw., equipped with S. Morgan Smith turbines driving electric generators, has let contracts for a steam plant of half that capacity to help out on the peaks and serve as a reserve.

The construction of a pumping plant and modern system of water works has been decided upon at Franklin, N. C. Bids covering equipment will be taken about July 1.

Interests identified with the T. Harlan Company, Trenton, Tenn., may build a new wood working plant in that vicinity.

Equipment for a pumping plant and water distribution system will be purchased shortly at Brookville, Miss.

The Finkbine Lumber Company, Wiggins, Miss., will add some new machinery.

M. F. Sullivan and others of Chattanooga, Tenn., have organized the Municipal Engineering & Construction Company, which will design and construct electric power plants, pumping stations and water and sewage systems for municipalities in that section.

Work has been started at Leesville, La., on the new locomotive repair shops for the Kansas City Southern Railway. The Arnold Company, Chicago, has the contract.

The city of Milton, Fla., W. W. Clark, mayor, will issue bonds for a system of water works and an electric light plant. It is expected that an engineer will be selected within the next 60 days, when a list of equipment necessary can be obtained.

The Richmond & Henrico Railway Company, Richmond, Va., John C. Hagan, secretary, and E. W. Trofford, engineer, has purchased a site in that city on which will be erected a power plant. Particulars may be obtained by addressing the secretary direct.

J. N. Hazlehurst, Atlanta, Ga., is consulting engineer for the proposed additions to the water works at Gadsden, Ala., recently mentioned. Two or three pumps, boilers, filters, &c., will be required. Particulars may be obtained from the engineer or by addressing W. F. Murphree, mayor, Gadsden.

Motley, Goodlett & Richmond have incorporated at Memphis, Tenn., to manufacture, repair and deal in machinery. It is also the intention of the company to do a general business in selling and repairing automobiles and motorcycles. J. S. Motley is president, J. E. J. Goodlett, vice-president and general manager, and W. I. McGoldrick, secretary-treasurer.

The construction of the new plant of the Birmingham Railway & Locomotive Company, Birmingham, Ala., is well under way. Present machinery requirements have been filled, but later on some additional machine tools will be required.

The Mayor of Cairo, Ga., can give information regarding proposed extension of the electric light system and addition to the water works.

The requirements of the Hale Buggy Company, Anniston, Ala., now building a plant, include only some individual motors and flexible drills. Construction work on the plant has practically been completed.

The Palmetto Automobile & Iron Works has been incorporated at Greenville, S. C., with \$20,000 capital stock. It has acquired the plant of Cely & Brother, which will be improved. The company will do general foundry and machine work, and is in the market for a milling machine and a foundry cupola. K. S. Conrad is president and R. F. Lindsay, master mechanic.

The municipality of Sylvania, Ga., is having plans prepared by J. B. McCrary & Co., Atlanta, Ga., for improvements to its water works and lighting system, which will cost approximately \$40,000. Construction bids are expected to be open some time in June.

The Northwest

ST. PAUL, MINN., May 16, 1910.

The most prominent feature of machinery sales at present, aside from the conditions mentioned within the past fortnight, is caused by buying or inquiries in behalf of hydroelectric projects. Several important groups of financial interests centering in New York, Boston, Cleveland and Chicago have started in to systematically develop the water powers of Minnesota, South Dakota and other States of the Northwest, wherever the work can be made profitable; and numerous single projects are being put through by companies, cities or individuals. In this respect the year 1910 will undoubtedly be a record-breaker, and it looks as though the movement had only begun. For the more important developments steam reserve plants are also being planned, to take the excess load in seasons of low head; but in future years the tendency will probably be more toward producer gas units, as investigations now being carried forward are showing better operating economy for these plants where the right kind of fuel can be had.

In the iron country and among the Western mines and smelters there has been more than ordinarily heavy purchasing this spring of industrial cars, locomotives and other apparatus used in outside operations. Pumps, compressors, hoists, &c., for yard service or construction work, in addition to the heavier equipment for service in the mines and ore reduction plants themselves, are also largely needed. In short, there has never been a season when so much in the line of mechanical equipment could be sold to the mining industries; and the present general use of motors, lighting sets, &c., has carried the sale of electrical apparatus into every branch of this trade.

The Virginia Electric Power & Water Company, Duluth, is completing the installation of a low pressure steam turbine and generator of 300 kw. in the plant of the Virginia & Rainy Lake Company, Virginia, Minn.

The Consumers' Power Company, Cannon Falls, Minn., has contracted for two Francis turbines of 1500 hp. aggregate capacity to be built by the Pelton Water Wheel Company, San Francisco, together with exciter unit, governors, &c. A feature of these turbines is the fact that each will be equipped with a four-ton equalizing fly-wheel. An additional and larger installation of similar character will be made later on by the same company.

The Power Equipment Company, Minneapolis, has had liberal inquiries of late for the Smith suction gas producers and Foos gas engines which it is handling, indicating a growing interest among power users of the Northwest in plants of that character. Other concerns offering similar apparatus report the same experience.

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From Park River, N. D., it is reported that A. C. Loree of that place will install a machine shop in connection with an automobile garage which he has started to build.

Plans adopted by the authorities at Meridian, Idaho, for the water system recently mentioned, provide for a motor driven centrifugal pump of moderate capacity and an elevated steel tank to hold 65,000 gal.

The Crane & Ordway Company, St. Paul, which is directly represented at various points in the American and Canadian Northwest, has had a good sale this season of its improved Eclipse boiler, which is of very compact construction for each of its rated capacities.

An electric power and pumping station will be constructed at Belfield, N. D., but whether by the city or under a franchise granted to a private corporation has not yet been determined.

The Contractors' Supply Company, Minneapolis, has opened new offices in the Sykes block.

The Northern Engineering & Finance Company, Palladio Building, Duluth, is doing a large amount of business along various lines of industrial development.

At Ipswich, S. D., it has been decided to acquire a municipal pumping plant, and funds for the purchase of the necessary equipment will soon be available.

A notable installation of centrifugal pumps used for dewatering foundation pits is that made in connection with the rebuilding of the United Missouri River Power Company's dam at Hauser Lake, Mont. There are in use eight 12-in. pumps, built by the Kingsford Foundry & Machine Company, Oswego, N. Y., each driven from a General Electric motor of 150 hp.

The Baker Valve Company, Minneapolis, Minn., is making a large number of sales in various parts of the Northwest, and especially on the Pacific Coast, of its new type balanced piston valve for engines, which is claimed to effect a gain in economy of 20 per cent.

Some new pumping machinery will probably be required in the fall at Austin, Minn., where the problem of a better water supply system is under investigation.

A light manufacturing building, for which a heating plant, motors, blowers, sprinklers and considerable mechanical equipment will be required, is to be erected by Griggs, Cooper & Co., St. Paul.

The Ware Grain Binder Attachment Company has secured a location at Aberdeen, S. D., for the erection of a branch plant.

Some changes and additions of machinery, with a view to improving the mechanical efficiency of the mills, will be made this year in the extensive plant of the Washburn-Crosby Company at Minneapolis; but they are to be brought about gradually. The mills in other cities are also being arranged for an increased output; so that the aggregate of this company's purchases is, and will continue to be, very considerable.

The Central West

DES MOINES, IOWA, May 16, 1910.

Dealers in the principal centers of distribution are apparently receiving a fair volume of small orders. Sales of tools are scattered among the various industries of this section, being concentrated mainly at its eastern end. As a whole the demand from small machine and repair shops predominates, with jobbing foundries next in line. Some rather good lists are, however, expected to come out before long from machinery makers who are planning new shops, particularly gasoline engine builders and manufacturers of apparatus used in construction work. Purchases by railroads for terminal improvements, while made in small lots at a time, help to swell the total volume of sales very materially.

The Des Moines Bridge & Iron Works has taken the contract for a steel tower and two steel tanks to be used in the water system at Davis, Cal.

The Ireton Electric Light & Power Company, recently organized at Ireton, Iowa, has arranged for the construction and equipment of a modern electric generating station. Machinery has been purchased.

The Nebraska Portland Cement Company will soon start work on a plant to be erected at Superior, Neb.

From Sioux City, Iowa, it is reported that the Sioux City Foundry & Mfg. Company's plant is being torn down and new buildings erected in a better location.

An unconfirmed report from Denver, Colo., states that the Universal Motor Company of that city desires location for a large automobile plant.

The Champion Stone Company, Stone City, Iowa, will add to its quarry equipment, which is electrically operated.

It is reported from McCook, Neb., that a new concern, known as the McCook Machinery & Iron Works, will establish a metal working plant there.

The Hecla Granite & Mining Company, Salida, Colo., which recently commenced operations there, will be in need of considerable apparatus during the next few months, although its initial requirements have been provided for.

The large plant of the Iowa Portland Cement Company, Des Moines, which will be a more or less constant buyer of equipment of various kinds from this time forward, has been completed and placed in operation.

The Clinton Bridge & Iron Company, Clinton, Iowa, has taken a contract for five steel bridges to be erected in a new Illinois drainage district.

The Utah Light & Railway Company, Salt Lake City, will install a power transformer of unusually large size, 1100 kw., in one of its substations. Construction work has been started on an extension to Midvale.

The Northwestern States Portland Cement Company, Mason City, Iowa, is strengthening the mechanical efficiency of its plant and providing for some additional apparatus.

The Progress Company and the Mill Creek Power Company, Salt Lake City, Utah, are erecting in Mill Creek canyon a power plant at a cost of \$150,000.

The Sheridan Iron Works, Sheridan, Wyo., has completed plans for erecting a plant at that point. The new building will be 50 x 125 ft., two stories, and will contain a machine shop and foundry, together with an adjoining blacksmith shop 25 x 50 ft. The company will be in the market later on for a universal milling machine, a planer, steam hammer and engine lathe. C. A. McIntyre is secretary and treasurer.

The Southwest

KANSAS CITY, MO., May 16, 1910.

Strong support is being given the market at this time by the purchasing done in behalf of cement, lime, brick and stone plants. There exists a demand for building materials which has encouraged the immediate enlargement, all through this territory, of the facilities used in their production, including crushers, pulverizers, ball mills, tube mills, steel rotary kilns, pumps, compressors, conveyors and detail apparatus of many different kinds. For all of these there is now active inquiry; and dealers, especially, are benefiting by the demand for everything that can be carried in stock, as prompt shipment is usually desired.

Sales of shafting, hangers, boxes, belts, pulleys, &c., have been more than ordinarily large of late, with tendency to increase still further. This last named business, however, is rather unevenly distributed. Houses that handle well advertised lines and also make a special effort to hold the trade of old customers have all they can do to keep up with present inquiries, while others appear to be satisfied with only moderate sales on the assumption that these are not costing them much to make.

The marked inclination of officials connected with municipal plants to specify a much higher grade of machinery than formerly is more in evidence than ever since the heavy aggregate of bond issues for improvements, recently voted, has become available in purchasing. Apparatus of demonstrated operating economy sells to considerably better advantage than in former years, and the general range of prices is higher as compared with those asked for machinery of admittedly lower efficiency. The same is true of buying for electric power and pumping stations operated by private corporations in the smaller cities and towns.

The American Foundry & Mfg. Company, St. Louis, Mo., has experienced a lively demand this spring from cities and towns in every section of the Southwest for water works supplies of its manufacture. The increasing use of gate valves is especially noticeable, as more thorough measures for controlling the flow are now being taken than at any time heretofore.

Steam or gasoline engine driven pumps, with accessory apparatus for a public water system, will probably be called for this summer at Waldron, Ark., where the authorities are now planning means to that end.

The authorities at Humboldt, Kan., have engaged the J. S. Worley Company, Kansas City, to prepare plans for a sewage purification system, including its mechanical equipment.

The Fayette Electric Light & Power Company, Fayette, Mo., which has been operating the local municipal plant of 125-kw. capacity, will install a new unit of its own having a rated output of 150 to 200 kw., together with auxiliary apparatus. The dynamo is to be driven by a Corliss engine.

Plans are about to be made for a municipal pumping plant and water supply system at Alice, Texas, where construction has been authorized. Machinery and material will be contracted for early in the summer.

The municipal electric light and water works station at McPherson, Kan., is to be remodeled and new pumping units installed. Other improvements are also contemplated.

The Machinery Markets

The W. D. Reeves Lumber Company, Helena, Ark., will add to its plant a direct current dynamo of 100 to 125 kw. and other apparatus to furnish power to motors for driving machinery.

Equipment for the pumping station to be built by the city of Stigler, Okla., will probably be bought next month as a bond issue to cover the estimated cost has been voted.

Two gas engine driven dynamo sets of 250-kw. aggregate capacity have been installed by the Lumbermen's Portland Cement Company, Carlyle, Kan. The motive power is furnished by natural gas. Current will be used for operating motors. This is the beginning of a more extensive plant to be constructed later on as the company's manufacturing facilities need to be enlarged. The main offices are in the Long Building, Kansas City.

The Bonner Portland Cement Company's plant at Bonner Springs, Kan., which has a number of mills for grinding, will need to add some machines to that department in order to load the kilns to their full working capacity.

The installation of a steam turbine plant of 500 kw. or larger has been recommended at Independence, Mo., where an engineer was recently engaged by the city to plan improvements in the municipal power and lighting station. Engine driven units aggregating 300 kw., one or more of which could be dispensed with under the proposed arrangement, are now installed.

The Doe Run Lead Company, Elvins, Mo., is putting its concentrating plant in condition for a heavy season's run and equipment necessary to the industry will be required at intervals during the year. Huntington mills are used in the reduction of the ore.

The Berry Foundry & Mfg. Company, which operates a large plant for castings and machine work at St. Joseph, Mo., is also doing a heavy business at this time in structural steel and various steel shapes used for building operations, the activity in which is very pronounced.

Preparations are being made at Flagstaff, Ariz., for a thoroughly modern timber cutting and woodworking plant to be erected by the Flagstaff Lumber Mfg. Company.

The erection of a municipal power and lighting station is under consideration at Parsons, Kan. A gas-engine-driven plant has just been installed by the local traction company and one of similar type is favored by city officials.

The Autogenous Welding Devices Company, general dealer in oxy-acetylene welding and cutting apparatus, also maintains in Kansas City what is stated to be the largest welding plant in the West, where broken or damaged castings of all kinds are repaired.

The Eclipse Brass Foundry, F. L. Pitts, Mgr., has just been established at Wichita, Kan., to do all kinds of custom work in brass, bronze and aluminum castings, including the making of patterns. Some machinery has been installed and more will be provided. Electric power is being used. The building stands on North Santa Fe avenue, near First street.

Plans for a municipal power and pumping station at Canton, Kan., are being prepared.

The Imperial Mfg. Company, Independence, Kan., is understood to have arranged for a two-story addition to its plant.

The International Steam Pump Company has established Frank D. Shumate at El Paso, Texas, as its representative for that territory.

A new factory building will be erected in Kansas City by the Kansas City Vehicle Company.

The Globe Pressed Brick Company, Ferris, Texas, whose plant was destroyed by fire, will rebuild for a larger output.

In connection with new terminals for the Chicago, Rock Island & Pacific Railroad at Wichita, Kan., there will be constructed a power plant, roundhouse and repair shops of moderate size. Detailed information can be obtained in due course from the road's officials, but the preliminary arrangements have not yet been completed.

Installation of machinery is about to begin in the large new bandmill and veneer plant of the Singer Sewing Machine Company at Trumann, Ark. This establishment will furnish opportunities for the sale of considerable equipment for extension and maintenance at frequent intervals in the future.

The Cia. Manufacturera Cemento Portland, Mexico City, Mexico, will still further extend its production facilities by the addition of another rotary kiln unit and auxiliary machinery.

The Frank L. Buchanan Mining Machinery Mfg. Company, St. Louis, Mo., recently incorporated for \$100,000, is about to close a deal with a town near St. Louis for a factory site. The equipment to be required will consist of a complete outfit for a machine shop. The company has not decided as yet whether it will do its own foundry work, as this will depend upon certain contingencies not definitely determined. It has already produced a number of its combined rock breakers and pulverizers, but advises that its

progress has been necessarily slow because of lack of manufacturing facilities.

The municipality of Cotulla, Texas, C. F. Brinkley, mayor, intends to establish an electric light plant and water works. Particulars may be obtained by addressing the Mayor direct.

The Hope Metal Frame Screen Mfg. Company has been incorporated at Hope, Ark., with \$20,000 capital stock. A. L. Black is president, W. D. Hudson, secretary-treasurer and W. M. Smith, manager. The company will manufacture a rust proof metal frame insect screen. It is erecting a factory, 60 x 120 ft., two stories, which will be equipped with modern sheet metal and woodworking machinery. It is in the market for two alternating current, 60 cycle, 100 to 200 volt single phase motors, special metal working machinery and tools, including a riveting machine, and punch and also for wire cloth and sheet metal, necessary for this particular industry. Until June 10 all communications should be addressed to the company's St. Louis, Mo., office, 754 Century Building.

The North Pacific Coast

SEATTLE, WASH., May 12, 1910.

Development work in the Pacific Northwest on both sides of the boundary continues to stimulate the machinery trade in all leading centers of distribution; and a further factor of increasing promise is to be found in the concerted efforts of local commercial bodies to attract new manufacturing industries, which have met with notable success. The net result has been a much greater demand for equipment than would otherwise have existed; a broader market occasioned by future maintenance and growth; and the bringing to the North Coast of hundreds of skilled workmen, with the accompanying need of manufactured articles to meet their living necessities. By all the rules of business, therefore, next season ought to be in advance of this.

From the standpoint of current sales, the machinery trade is fairly satisfactory, being about as recently stated. Repair work continues to be a profitable adjunct of regular lines of manufacturing and keeps some of the smaller shops out of harmful competition with leading manufacturers. Agents of Eastern concerns and district office managers all claim to be doing well. Collections are rather more promptly made than they were a while ago and deliveries have been greatly expedited by the improvement in railroad conditions east of the Mountains. Altogether, the outlook could hardly be better for this season of the year.

In the larger coast cities a factor of considerable importance at this time is also the quantity of marine work offering, much of it consisting of rush orders for repairs and new fittings which are very profitable to the shops making a feature of that character of service. The prospect is that, owing to the heavy movement of ocean traffic to the coast from all parts of the world, this line of trade will increase in volume.

A noteworthy feature of the metal industries this season is the rapidly growing application of autogenous welding, brazing, &c., to repair work. Several concerns on the north coast are making a specialty of it and for marine jobs in particular it often effects great saving through elimination of delay. The welding apparatus is also said to have been introduced in steel foundries for severing the heads of large castings and to be used for cutting columns, beams, &c., in structural work, and clearing away wreckage of twisted metals caused by fires or explosions; so that it has a wide range of utility. Repair outfits are in service at the plants of the Portland Oxy-Acetylene Welding Company, Portland Brazing, Machine & Coppersmith Works, Ferrofix Brazing & Machine Works, Seattle, and the Seattle Oxy-Acetylene Company. The last named, in advertising its work, emphasizes the fact that the method employed is not brazing but welding.

Burpee & Letson, Ltd., South Bellingham, Wash., have one of the busiest shops in that section, orders for machines of their manufacture being particularly brisk at the present time.

The plant of the Langley Mfg. Company, Langley, Wash., has been disposed of to A. Melson and H. P. Jensen of that place, who will make some improvements, including the installation of an electric dynamo set.

The Seattle branch of Joshua Oldham & Sons is opening up a shop equipped with light, motor driven tools for repair work, swaging, sharpening, &c.

The Great Northern Railway Company will build a new roundhouse, with repair equipment, at one of its yards in Seattle, Wash.

L. D. Kinney, North Bend, Ore., has organized a com-

The Machinery Markets

pany to build an electric traction line from that place to Marshfield, Ore. The matter of power machinery will be taken up this summer.

E. C. Peery, who is in business at Scio, Ore., has organized the Jordan Valley Railroad Company, to build a line operated by electric or gasoline motor power. Plans for equipment have not yet been worked out.

In reconstructing the portion of its plant which suffered from a recent fire, the Olympic Foundry & Machine Company, Tacoma, Wash., will provide for considerably enlarged capacity.

The Industrial Engineering Company, Portland, Ore., is reported incorporated by W. C. Alvord, E. H. Corbett and J. H. LaMoree.

Through the efforts of the Chamber of Commerce at Bellingham, Wash., the Northwestern Wheel & Wagon Company will probably be induced to build a plant there. Present communication with it is only to be had through that organization.

Two new boilers will be required for a mill at Ranier, Ore., which was recently acquired by interests identified with the Allen Shingle Company, Portland, Ore.

The City of Union, Ore., has employed Louis C. Kelsey, 402 Dooley Building, Salt Lake City, Utah, to design and superintend the construction of a hydroelectric plant and supply main which will consist of 20,000 ft. of 36 in. continuous wooden stave pipe, 12,000 ft. of 12 in. wire wound pipe, a 150-kw. generator, turbine water wheel and six miles of transmission line. The city will hold an election in the near future for the purpose of voting bonds. The estimated cost of the plant is \$80,500.

The Bellingham Bay Lumber Company, Bellingham, Wash., is planning additional machinery to double the capacity of the plant.

E. Lawlor is planning to build a boiler works and forge shop equipped with steam hammers, &c., at Raymond, Wash.

The Frazer Iron Works is planning a branch foundry at Springfield, Ore.

It is reported that the American Cereal Company will erect a large mill on Puget Sound.

G. H. Fraser of Eugene, Ore., is building a plant at Springfield, Ore., which will be used for the manufacture of iron working machinery. The factory will be operated by a company known as the Springfield Iron & Steel Works. The necessary machinery will not be purchased until fall.

The Pacific Iron Works, Astoria, Ore., has had a good business for some months in tools, iron blocks, &c., for logging work, and if the trade holds steady for the remainder of the year it will compel some provision for enlarged production.

Tanks for use with sprinkler systems are being made a specialty this season by the Grays Harbor Commercial Company, Seattle, Wash.

The plant of the Humbird Lumber Company, Sand Point, Idaho, will probably be rebuilt for enlarged capacity and made the most modern of any in the Northwest.

The Washington Water Power Company, Spokane, is gradually extending its service among the mining camps of eastern Washington and northern Idaho. Among contracts recently taken is one to furnish current for operating a motor-driven compressor and other machinery at the plant of the Caledonia Mining Company near Wardner, Idaho.

Tentative plans have been made by the Seattle Electric Company, Seattle, for a large new power plant.

H. B. Perine, Seattle, who represents A. Hankey & Co., Rockdale, Mass., in the sale of machine knives, has had an excellent trade among north coast plants ever since the present era of activity started, and prospects for the remainder of the year could hardly be better.

The Queen City Machine Works, Seattle, Wash., which is very busy, will install one or more additional motors for operating machinery.

C. Remschel, who was for some years in the service of the Allis-Chalmers Company, Milwaukee, recently opened an office in Seattle as consulting and contracting engineer.

The Pacific Machinery Company, Portland, which handles engines and boilers for the Atlas Engine Works, Indianapolis, Ind., has found that power users generally are more than ordinarily interested this spring in the improvement of their plants, as the demands made upon nearly all such in respect to service have recently been very severe.

The Puget Sound & Alaska Powder Company is preparing to build a dock at Everett, Wash., which will be equipped with modern transfer and handling machinery.

The W. W. Wood Company, Raymond, Wash., recently let contracts for machinery to be put in service at a large new veneer plant. This company will be a good buyer of future equipment, as its business is rapidly expanding.

The Willapa Trust Company, Portland, Ore., is contemplating the erection of a large power plant at Grays River Falls, the power from the plant to be transmitted to the new town of Napoleon, Wash., on the Willapa Harbor, where it will be distributed for electric light and power

purposes. The company is also considering the establishment of several new manufacturing industries at that place, including a large pulp and paper mill.

The Walla Walla Valley Railroad Company, Portland, Ore., has filed articles of incorporation with a capital stock of \$500,000. It is the intention of the company to build and equip a system of street railway cars in the city of Walla Walla and to build an interurban line across the State line from Walla Walla to the town of Milton, Ore. The incorporators are L. A. McArthur, R. T. Greer and H. D. Hanna, all of Portland. The State agent of the company is E. D. Filler of Walla Walla.

The plant of the Los Angeles Engine Works, Los Angeles, Cal., was practically destroyed by fire last week.

Government Purchases

WASHINGTON, D. C., May 16, 1910.

The Constructing Quartermaster at Fort Des Moines, Iowa, will open bids June 3 for the furnishing and installing of steam heating plant in the hospital at that post.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids May 31 under schedule 2506, for two 10-hp. electric motors for the Philadelphia, Pa., station, and four induction motors for Norfolk, Va. Schedule 2495 calls for one hoisting engine and boiler complete for Boston, Mass. On June 7 bids will be opened under schedule 2519 for one universal turret lathe and one geared friction head screw machine for Charleston, S. C.

The Isthmian Canal Commission opened bids May 11 under class 5, for six wattmeters and one ammeter. Bidder 46, National Brass & Copper Tube Company, New York, \$5962.60; 49, New Jersey Foundry & Machine Company, New York, \$4901.40; 82, Fox Brothers Company, New York, \$4740.78.

Bids were opened May 11 by the chief signal officer, Washington, for furnishing an engine and generator as follows:

The Otto Gas Engine Works, Philadelphia, Pa., \$928 for engine; Sheffield Gas Power Company, Kansas City, Mo., \$616.75 for engine and \$668.76 for generator; Fairbanks, Morse & Co., New York, \$1000 for engine, \$555 for generator; National Electrical Supply Company, Washington, \$1075 for engine, \$610 for generator.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids May 10 for the following:

Class 1.—One rapid action punch—Bidder 62, Harron, Ricard & McCone, San Francisco, Cal., \$725; 112, Joseph T. Ryerson & Son, Chicago, Ill., \$657; 153, Wickes Brothers, Saginaw, Mich., \$545 and \$565; 159, Covington Machine Works, Covington, Va., \$800.

Class 11.—Nineteen induction motors—Bidder 2, Allis-Chalmers Company, Milwaukee, Wis., \$3085; 18, Burke Electric Company, Erie, Pa., \$3624.40; 53, General Electric Company, Schenectady, N. Y., \$3324; 113, Richmond Electric Company, Richmond, Va., \$3751; 148, Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., \$3286.50; 149, Wagner Electric Company, St. Louis, Mo., \$3133.38.

Class 111.—Twenty-five induction motors—Bidder 2, Allis-Chalmers Company, Milwaukee, Wis., \$9789.78; 56, General Electric Company, Schenectady, N. Y., \$10,441; 113, Richmond Electric Company, Richmond, Va., \$7305, part; 147, Western Electric Company, New York, \$10,105.40; 148, Westinghouse Electric Mfg. Company, Pittsburgh, Pa., \$11,092; 149, Wagner Electric Company, St. Louis, Mo., \$11,494.05.

Class 112.—Twenty-three oil-cooled transformers—Bidder 2, Allis-Chalmers Company, Milwaukee, Wis., \$5410.39; 35, Duncan Electric Mfg. Company, Lafayette, Ind., \$5039; 56, General Electric Company, Schenectady, N. Y., \$5600.70; 84, Malony Electric Company, St. Louis, Mo., \$4954.56; 85, Montgomery & Co., New York, \$5838; 93, National Electrical Supply Company, Washington, \$4814; 148, Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., \$5327.65; 149, Wagner Electric Company, St. Louis, Mo., \$6279.80.

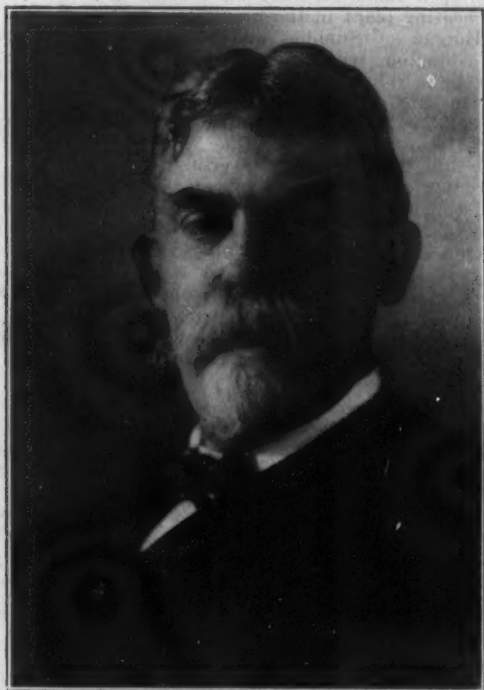
J. E. Conant & Co., Lowell, Mass., will sell at auction May 26 the plants of the Empire State Engineering Company and the Twinco Stamping Works, at Rome, N. Y., in lots to suit purchasers. There are seven parcels of real estate, recently used and now equipped as large and small industrial plants, also tenement properties; 506 lots of modern, late type, practically new, very desirable machinery and mechanical equipment in prime condition; also refrigerating or ice machines. The real estate is on West Dominick street, the main thoroughfare of the city, extends through to the Erie Canal, Arsenal street and Arsenal place, is near the New York Central Lines, is on the belt line of the street railroad, within a few minutes' walk of the business center of Rome, and not far from the new Barge Canal connecting Buffalo and Albany. The sale will take place upon or near the respective premises on the day named above, beginning at half-past 10 o'clock in the forenoon with the real estate.

Obituary

JAMES W. VAN CLEAVE

James Wallace Van Cleave, president of the Buck's Stove and Range Company, St. Louis, died in that city May 15 of heart disease. He had been seriously ill for several weeks, and there had been a partial recovery followed by a relapse. Until six months ago he had been in robust health. In the past three or four years the difficulty in which Mr. Van Cleave's company was involved with the American Federation of Labor and the litigation growing out of it had made great demands upon his energies, and it is believed this struggle at length caused a serious impairment of his physical powers.

Mr. Van Cleave's prominence in the past few years was chiefly in connection with the presidency of the



JAMES W. VAN CLEAVE.

National Association of Manufacturers, to which he was first elected in 1906. He was re-elected in 1907 and 1908, and refused re-election in 1909. He was prominent also in the organization of the Citizens' Industrial Association and was president of the St. Louis branch from 1902 to 1909. On retiring from the presidency of the National Association of Manufacturers last year he was given a bronze tablet, with an appreciative inscription, and a check for \$10,000. This amount was subscribed by the members as a partial reimbursement of the expense he had incurred not only as president, but as a leader of employers in the fight against the boycott of labor unions. In 1908 Mr. Van Cleave organized the National Council for Industrial Defense and was its chairman. This organization has a membership of 228 associations of manufacturers, and its chief object is to guard against unfriendly legislation, chiefly such as is instigated by labor unions.

Previous to his election as president of the National Association of Manufacturers Mr. Van Cleave had never been involved in any serious trouble with his employees. His company was a member of the National Association of Stove Manufacturers, and as a member of the Stove Founders' National Defense Association was regularly represented by this association's committee in conference with the Iron Molders' Union to settle questions arising between the manufacturers and the stove molders. In 1906, owing to accumulating evidence that the union men in his company's em-

ploy, particularly the metal polishers, were limiting production, he discharged those whom he considered the ring leaders. The International Union of Metal Polishers declared a boycott against the Buck's Stove & Range Company and in November, 1906, the American Federation of Labor ordered the company's name included in the "We Don't Patronize" list of the *American Federationist*. The injunction proceedings against the American Federation officers, the various court decisions against the latter and their organization, the sentence of Samuel Gompers, John Mitchell and Frank Morrison to prison for contempt of court, and the other developments of this famous litigation are well known.

James W. Van Cleave was born in Marion County, Ky., July 15, 1849. He entered the Confederate Army and served under General Morgan. In 1867 he engaged in the manufacture of stoves and ranges in Tennessee. Later he went to St. Louis and formed a partnership which developed into the Buck's Stove & Range Company, the company taking its name from Mr. Van Cleave's original partner. Mr. Van Cleave has been for years one of the most forceful figures in the metal working trades, and has been fearless and able in his resistance of the aggressive attempts of trade unions to dominate American industry. His opposition to radical unionism was particularly concentrated on the closed shop and the boycott and the growth of the open shop movement in the past few years owes much to his efforts. Of his family there remain his wife, four sons and a daughter.

PATRICK McDONALD, Youngstown, Ohio, died May 10, aged 85 years. He was born in Ireland, was brought to this country by his parents when two years old, and was reared in Pittsburgh, becoming a steel worker. It is specially worthy of note that several of his sons are prominent in the steel trade. Among them are Thomas McDonald, district superintendent of the Carnegie Steel Company, at Youngstown; Joseph A. McDonald, general superintendent of the Ohio Works of the same company; Frank D. McDonald, superintendent of the converting department of the Bessemer Works of the Republic Iron & Steel Company, Youngstown; Louis N. McDonald, superintendent of the open hearth plant of the Ohio Works, Carnegie Company, Youngstown. He leaves three other sons and four daughters.

WEBSTER M. SAMUELS, secretary of the Trenton Iron Company, Trenton, N. J., died at St. Louis, May 14, from the effects of a self-inflicted wound. He had been suffering for some months from a nervous breakdown. He was 27 years of age.

CHARLES R. CLOW, vice-president of James B. Clow & Sons, Chicago, died May 6 of cerebral hemorrhage, aged 45 years. He was born in Pittsburgh and after completing his education he became identified with the business of his father, the late James B. Clow. He leaves a widow and a son.

The battleship Florida, built at the Brooklyn Navy Yard, was successfully launched May 12. This ship is the fourth of the American battleships of the Dreadnought type. The other vessels of this type are the Utah, the North Dakota and the Delaware. Some facts relative to the Florida are as follows: Full load displacement, 23,033 tons; length over all, 521 ft. 6 in.; breadth on load water line, 88 ft. 2½ in.; mean draft, 28 ft. 6 in.; estimated speed, on trial, 21 knots; indicated horsepower, 28,000; cost of hull, \$6,000,000; total cost, \$10,000,000. The Florida's armament will consist of 10 12-in. guns, 16 5-in. rapid fire guns; four 3-pounder automatic, two 1-pounder semiautomatic, two 3-in. field guns, two 3-in. automatic and two submerged torpedo tubes. The vessel was 63.4 per cent. completed when launched.

Supply and Machinery Convention

Fifth Annual of National and American Associations

The fifth annual convention of the National Supply & Machinery Dealers' Association and the American Supply & Machinery Manufacturers' Association at Atlantic City, the opening proceedings of which were reported in the last issue of *The Iron Age*, came to a close on the afternoon of May 13, when the Supply Dealers' Association elected its officers. The meeting was not so well attended as previous joint sessions of the two associations, nor were the proceedings in open session so replete with interest. The Manufacturers' Association did little at its sessions and most of the manufacturers made a pleasure jaunt out of the meeting and left what association business there was to transact in the hands of the executive committee. At the joint session of the associations on Wednesday morning Wallace M. Pattison of the W. M. Pattison Supply Company, Cleveland, Ohio, who is president of the Dealers' Association, gave a comprehensive résumé of the programme planned for that association in his annual address, which was in part as follows:

President Pattison's Address

To-day our membership is practically double what it was at the time we held our last meeting, we now having enrolled some 130 members. This number is largely in excess of our membership at any previous time and augurs well for successful work during the coming year. The strength of a trade organization like this, its ability to get results and make itself valuable to its members, is measured largely by the number and character of its membership.

I can but feel that the one great benefit that is made possible through a membership in this or any other trade association is the opportunity it affords of meeting your business associates and competitors in a friendly and social way.

No man in the supply business to-day has any great advantage over his competitors. We seek our trade in the same channels and I find that we are all of about equal caliber mentally. We will continue to have competition, so let us make it honorable, friendly and clean competition, and let us unite to eliminate some of the piratical methods that have possibly existed heretofore. In the past we have been too quick to give credence to rumors of what others might be doing and without proper consultation or consideration put in effect certain policies which our better judgment would condemn.

Did it ever occur to you before some retaliatory measure had been adopted that you may possibly have been misinformed? Is not your experience the same as mine that your own men bring in the majority of these rumors of low prices and unfair competition?

The question of price competition is always a valid excuse for failure to get business, but they never come to you and tell you your prices are too low. At least that is not my experience.

Is it not going to better conditions very materially when we learn to do business in a sane way? Through an organization like this we learn to personally know and esteem our competitors, so that in a friendly way we can jointly consider these matters of mutual interest. When we have reached that point we will have reached the highest type of association work. I do not refer to price agreements, for that might be illegal, but rather to the opportunity to discuss vital questions of policy and principle that should govern our business methods. I think that you agree with me in my statement that the good-will, friendship and co-operation of our competitors is a very valuable asset in our business.

THE RESALE PRICE.

Possibly there is no one topic which so vitally interests us or which has been more under discussion than that of a resale price. Much has been said in its favor both by manufacturers and jobbers, but there are those who are still opposed to this principle in selling. The practice, however, is growing in favor every day and there can be no doubt but what in certain lines its introduction would prove most beneficial. It is almost needless to say that when the manufacturer does adopt this policy it should be maintained by us absolutely. Any failure to do so could but have a most harmful effect. My advice would be to encourage the manufacturers to adopt this policy whenever possible and then

give the movement our hearty co-operation in order to make its continuance possible.

THE CASH DISCOUNT.

The question of uniform cash discounts is one that should receive consideration. There are those manufacturers who still quote net terms or possibly 1 per cent. cash discount. In the multiplicity of articles handled by a modern jobbing house it is impossible to segregate the items which you purchase on net or on 1 per cent. terms, and in settlement you probably follow the usual practice and allow your customers 2 per cent. cash on this entire account. On these items you lose 1 or 2 per cent. cash discount as the case may be. This, considered in itself, seems a matter of comparatively little importance, but you should recall that after deducting the expense of doing business and your profit and loss account you possibly won't average much over 3 per cent. net profit on your gross sale. You can thus readily see what an important bearing this has on the ultimate success of your business.

We are not asking that the manufacturer in allowing a cash discount should curtail his profit so that without injustice to himself he could give this premium of 2 per cent. for prompt payment. Some large interests at our suggestion have adopted these terms and our future effort should be continued so that these terms may prevail generally.

CREDIT INFORMATION.

Another topic that might be considered with advantage to our members is the question of credit information. Where our members cover any considerable territory it frequently happens that a party of questionable credit may be buying from some 10 or 15 of our different members and scattering his credit.

At the present time the territory in which we operate is so interwoven and where our interests are so mutual that it would seem that some plan for an exchange of credit information based on actual experience might be devised that would prove most beneficial. In Cleveland we have this plan in effect with the most satisfactory results and the reports we get through our confidential secretary far surpass anything you can secure through your regular mercantile reports. It would appear to me that the scope of this work could be widened with excellent results.

It will be our pleasure to meet with the manufacturers' association in joint session, which undoubtedly will furnish an opportunity to bring up many questions of mutual interest. There should be nothing of an antagonistic nature develop on this occasion, as our interests are mutual. We might almost be considered as the selling end of their business and as such our suggestions as to the policy they should adopt in marketing their product through us should and doubtless will receive respectful consideration.

During the coming year I trust that we may be able to accomplish much for such of our members as make a specialty of machinery. The manufacturers are now strongly organized, and as a result of our past efforts, recognize the justice of our claims for increased remuneration and many of them are inclined to make this concession. We hope that increased discounts may soon become an established fact.

Just before the morning session closed John Trix, American Injector Company, Detroit, Mich., brought up the question of price cutting among the jobbers and said that a great deal of unfair competition among jobbers and dealers comes about through dishonesty among the jobbers, many of whom make misstatements to manufacturers as to prices quoted them by their competitors, and consequently bring about price-cutting wars that are disastrous to both manufacturers and dealers. Edgar Strong, Strong, Carlisle & Hammond Company, Cleveland, Ohio, speaking for the dealers, said that their chief complaint against manufacturers was that the latter frequently entered the market in the dealers' territory and sold to consumers cheaper than the dealers could afford to. Said he: "We have no objection to manufacturers entering the market, but we want the matter of profit settled one way or the other. Will you agree to sell us goods cheaper than you do consumers and will you make one price to consumers, so that we can sell them at the same price you ask, and make only a fair profit? I would like to see this settled one way or the other."

Before the morning session adjourned, A. E. Ford, president of the National Association of Jobbers of Wrought Pipe and Fittings, addressed the meeting and spoke for the cause of establishing closer relations between the association he represented and the Manufacturers' and Dealers' associations.

On Wednesday afternoon the dealers had an executive session, when W. H. Taylor, Allentown, Pa., spoke on "What Can Be Done to Overcome the Ever Increasing Expense Account?" There was some discussion and many suggestions were made following Mr. Taylor's address and most of the remarks concerned the intimate affairs of the companies whose representatives spoke. On Wednesday evening there was a vaudeville smoker and lunch at the hotel, at which the convention was held, which was attended by the ladies.

Joint Discussion of Resale Price

On the morning of May 12 there was another meeting of the two associations, which was conducted by the American Supply & Machinery Manufacturers' Association, with the dealers present. The discussion of the morning was largely over the question of resale prices and it was conceded by most of the speakers that manufacturers should make a resale price at which the dealers could sell at a profit and stick to that price. A number of the dealers declared that they frequently found, after looking up a sale, that the manufacturer had sold to the consumer direct and had made the consumer a price very near to that quoted the dealer. Mr. Pattison had quoted the experience of a prominent hardware manufacturer whose goods were in such demand that dealers attracted customers by selling them at cost. This manufacturer learned, Mr. Pattison explained, that inferior goods and imitations of his own goods were being offered at very near the price asked for his production. This tended to cheapen his own line in the consumers' estimation, and the manufacturer was forced to make a resale price both for his own benefit and for the benefit of the honest dealers who handled his goods. There was some discussion regarding how far the dealer should go in advertising new products. One manufacturer said that he was perfectly willing to solicit business on new lines and turn the customer so secured over to the dealer, but several dealers complained that the manufacturer as a rule does not go very far toward introducing new goods, and expects them to handle new lines at the same margin of profit they got on well-established and well-advertised lines.

On Thursday afternoon the dealers met in executive session and Mr. Strong spoke on "Salesmanship and the Relations of Salesmen to Their House." His address was along the lines of encouraging loyalty of salesmen by treating them fairly, and he said that in his experience the average salesman had proven to be a loyal individual. W. B. Yost, Lockwood-Leutkemeyer-Henry Company, Cleveland, Ohio, spoke on "Lump Sum Quotations," and following his address the jobbers adopted a resolution to the effect that in the future in quoting a lump sum on a large list of requirements that the price of the various items quoted be named separately, so that it might be more difficult for jobbers to shade prices on various lines in quoting a lump sum.

On Friday morning the members of the Dealers' Association who handle machinery held an executive session, which was presided over by J. W. Wright, president of J. W. Wright & Co., St. Louis, Mo., and the dealers discussed among themselves a number of questions at issue between them and manufacturers, and talked to some extent over recent advances in price on some lines of machinery. The same morning the manufacturers held an executive session also, at which the following resolution was passed:

Whereas, For the past two years the members of the American Supply and Machinery Manufacturers' Association have been

invited to attend the conventions of the dealers' association, both North and South; and

Whereas, This has entailed upon the manufacturers double expense and consumption of time, besides rendering impossible a full attendance of the managing heads of manufacturing houses; and

Whereas, The great success of the triple convention at Cincinnati in 1907 shows that the holding, at least periodically, of a centrally located triple joint convention would bring out the largest attendance and produce the most satisfactory results; be it therefore

Resolved, That the American Supply and Machinery Manufacturers' Association hold its next annual convention in Louisville, Ky., the last week in April, 1911, and the Southern and National dealers' associations be and they hereby are cordially invited to hold their next convention at the same time and place.

On Friday afternoon the dealers met and elected the following officers: President, Wallace M. Pattison, W. M. Pattison Supply Company, Cleveland, Ohio; first vice-president, W. L. Rodgers, Pittsburgh Gage & Supply Company, Pittsburgh, Pa.; second vice-president, J. A. Harron, Harron, Ricard & McCone, San Francisco, Cal.; advisory board, Edgar E. Strong, Strong, Carlisle & Hammond Company, Cleveland, Ohio; George Puchta, Queen City Supply Company, Cincinnati, Ohio; executive committee, Henry Prentiss, Prentiss Tool & Supply Company, New York; Charles S. Farquhar, Chandler & Farquhar Company, Boston, Mass.; M. B. Barkley, Cameron & Barkley Company, Charleston, S. C.; George Vonnegut, Vonnegut Hardware Company, Indianapolis, Ind.; secretary-treasurer, Thomas A. Fernley, Philadelphia, Pa.; advisory treasurer, T. James Fernley, Philadelphia, Pa.

The Duesseldorf International Congress.—Extensive preparations are being made for the International Congress of Mining, Metallurgy, Applied Mechanics and Practical Geology, which is to meet in Düsseldorf, Germany, June 20 to 23. The Committee of Honor includes 52 persons, representing the highest imperial and state authorities, the cities taking part in the congress, technological universities, mining schools, &c. The Council of the Committee of Organization, consisting of 88 members, includes many leading manufacturers and scientists. Applications for membership had reached 750 early this year, of which about one-third were from countries outside of Germany. A provisional programme has been issued, which gives a formidable list of papers on a wide range of subjects.

Cuba Requires Invoices Written in Spanish.—Cardona & Co., Cienfuegos, Cuba, have issued a circular to their correspondents in this country from which the following statement is taken: "The Secretary of Finance has issued an order, No. 11 under date of April 18, 1910, to take effect from July 18, setting forth that all invoices, bills of lading, &c., produced for custom house clearance must be written in Spanish, and provision is made therein for penalties for non-compliance with the aforesaid order. Therefore, we beg to inform all parties concerned that according to this decision all shipping documents covering goods shipped to us should hereafter be made out to comply with the law, in Spanish, so as to avoid any pecuniary responsibility."

A Hydroelectric Paper Mill Plant.—The first complete electrical equipment ever installed in a pulp and paper mill was that recently furnished the Defiance Paper Company at Niagara Falls, N. Y., by the Westinghouse Electric & Mfg. Company, Pittsburgh, Pa. The plant has a capacity of 2000 hp., which is developed hydraulically by water from Niagara Falls. Every piece of machinery in both the pulp and the paper mills has its own electric motor. These, 40 in number, range in size from 1 up to 400 hp. Throughout the entire process of making the paper, from the wood to the roll, the power is supplied by electricity.

Personal

Dr. James Douglas has contributed a most interesting paper on the relations of the United States and Mexico to the series of publications of the American Association for International Conciliation, 501 West 116th street, New York City.

Peter J. McEntee, who has been connected, directly and indirectly, with the Pennsylvania Steel Company for over 20 years, has been appointed superintendent of the plant of the Federal Steel Foundry Company, Chester, Pa.

J. E. Touche, London, England, director of the Otis Steel Company, Ltd., arrived in this country this week on his semiannual visit to the plant of the company, at Cleveland, Ohio.

E. T. Edwards, Duquesne, Pa.; J. J. Porter, University of Cincinnati, Cincinnati; L. H. Winkler, Cambria Steel Company, Johnstown, Pa., and R. A. Newbould, Nova Scotia Steel & Coal Company, Sydney Mines, Cape Breton, Nova Scotia, were elected members of the Iron and Steel Institute at the recent meeting in London.

David F. Brodereck, who is in charge of the construction of the Cienfuegos water and sewer works, Cienfuegos, Cuba, is in New York on a short business visit. He will return to Cuba May 21. The Cienfuegos contract is one of the largest that has been let in Spanish-America in several years. Practically 95 per cent. of the necessary material was bought in the United States.

Robert Wetherill & Co., Inc., Chester, Pa., manufacturers of Corliss engines, boilers and heavy machinery, have opened a branch office in room 2053 Hudson Terminal Building, 50 Church street, New York, with Robert Wetherill, Jr., in charge.

Andrew Carnegie's associates in the Carnegie Veterans' Association have commissioned J. Massey Rhind, the sculptor, to model a heroic bronze statute of Mr. Carnegie, which will be placed on a pedestal in the grand foyer of the Carnegie Institute in Pittsburgh. The statue will represent Mr. Carnegie sitting in a characteristic pose.

J. J. Brooks, Jr., general sales manager of the Harbison-Walker Refractories Company, Pittsburgh, has been elected a director of the company.

Herbert H. Pease, formerly of the Stanley Works, New Britain, Conn., has become connected in an official capacity with the New Britain Machine Company.

At a special meeting of the directors of the New Home Sewing Machine Company, Orange, Mass., Charles R. Scarborough of New York, the first vice-president, was elected president to fill the vacancy caused by the death of John W. Wheeler; H. S. Dawley, second vice-president, was elected first vice-president; J. B. MacDonald of New York was elected second vice-president; E. M. Buell, assistant treasurer, was elected treasurer.

Among the New England machine tool builders who will spend some of the summer abroad are Henry D. Sharpe of the Brown & Sharpe Mfg. Company, Providence, R. I.; Charles H. Alvord of the Hendey Machine Company, Torrington, Conn., and Clayton O. Smith of the Norton Grinding Company, Worcester, Mass.

Fritz Thyssen, F. Dahl and F. Funke of the Deutscher Kaiser Works of August Thyssen, the well-known German iron manufacturer, are visiting prominent iron and steel works in the United States. F. Thyssen is a director in the Deutscher Kaiser Works and Messrs. Dahl and Funke are general manager and chief engineer, respectively.

W. S. Horner, Pittsburgh, Pa., director and special representative of the International Metal Products Company and the American Rolling Mill Company,

Middletown, Ohio, sailed for Europe on Wednesday, to be absent for several weeks.

H. P. Hill has resigned as president and withdrawn from the Hill-Hupfel Engineering Company. W. H. Fricke has been elected president. Mr. Hill will continue at 30 Church street, New York, in the gas producer, engineering and complete electrical installation business.

J. C. Hitchcock, Philadelphia, Pa., has become connected with L. R. Merritt in his sales department, representing the Brownell Company, Craig Ridgway & Son Company, W. A. Harris Steam Engineering Company and the Springfield Boiler & Engineering Company, with offices at 26 Cortlandt street, New York.

F. E. Norris, superintendent of the Carnegie Steel Company's Sharon and South Sharon, Pa., Works, sailed for England on the Lusitania May 18 and will be abroad about six weeks.

President Edgar S. Cook of the Warwick Iron & Steel Company, Pottstown, Pa., was honored with a testimonial dinner May 9 by the heads of departments of that company to celebrate his return from Japan. James P. Roe, superintendent of the Glasgow Iron Company, was among those present, and acted as toastmaster. The addresses made most effectively demonstrated the harmony prevailing throughout the company's forces.

Dr. Edward G. Acheson of the International Acheson Graphite Company, delivered a lecture on the evening of May 17 before the Automobile Club of America, New York City, on "Graphite," covering the manufacture of the artificial form, its deflocculation and its lubricating value in combination with oil and water.

J. E. Orr, formerly superintendent of the Sharon and South Sharon blast furnaces of the Carnegie Steel Company, has been named assistant superintendent of the Aliquippa furnaces of the Jones & Laughlin Steel Company.

Labor Notes

The bimonthly examination of the sales sheets of the Republic Iron & Steel Company and the Western Bar Iron Association, recently made at Pittsburgh, showed that prices obtained on shipments of iron bars in March and April do not entitle puddlers and finishers to any advance in wages for May and June. The puddling rate for May and June will remain at \$5.62½ a ton, the same as for the two previous months.

The Stark Rolling Mill Company, Canton, Ohio, states that the recent strike inaugurated by the Amalgamated Association against its mill has collapsed. The men are all back at work, and the mill is again running in full and having no trouble whatever. The strike was caused by Amalgamated Association agitators who seized upon the pretext of the difficulty in rolling the company's new product, Toncan metal sheets, and getting out the same tonnage as in steel. As a matter of fact, it is impossible to get anywhere near the same tonnage, there being a much larger percentage of waste in rolling, due to "stickers," &c. This matter was adjusted with the men themselves, and without the intervention of any agitators or labor organizers, and they are entirely satisfied, now that there has been an advance of approximately 20 per cent. granted for this work. The company has always operated an open mill and has a very loyal and efficient force of employees.

Molders and core makers engaged on heavy work in union shops in Cleveland, Ohio, who recently demanded an advance to \$3.50 per day, have reached an agreement with their employers on a basis of \$3.25 per day. This is an advance of 50 cents a day for core makers and 25 cents a day for the molders.

Conference of Oxy-Acetylene Interests

Regulations Proposed for Safer Construction and Use of Apparatus

A conference of insurance interests and manufacturers of oxy-acetylene welding and cutting apparatus was held at the Congress Hall, Chicago, May 11, 12 and 13, to consider and revise a code of rules which the underwriters propose to adopt governing the approval and use of the apparatus. The engineers of the National Board of Fire Underwriters, representing the leading insurance companies, have had this subject under consideration for some time. As the proposed rules, when adopted, will affect all manufacturers and users of oxy-acetylene torches and equipment, their possible provisions have aroused widespread interest.

The underwriters were represented by a sub-committee of their Board of Engineers, of which E. J. Smith, engineer, gases and oils, of the Chicago Underwriters' Laboratories, was chairman. The other members of this committee were W. H. Merrill, manager of the Chicago laboratories; W. D. Matthews of the Chicago Board of Underwriters and E. C. Bruen of New York, a member of the National Board.

The following representatives of the manufacturing and commercial interests were present:

Adams, H. S., Chicago Welding Company, Chicago, Ill.
 Bailey, Geo. M., Linde Air Products Company, Chicago, Ill.
 Bauld, Peter D., Union Welding Company, Chicago, Ill.
 Bauld, R. A., Union Welding Company, Chicago, Ill.
 Carney, M. J., Acetylene Apparatus Mfg. Company, Chicago, Ill.
 Carpenter, L. Geo. W., American Oxygen Company, Philadelphia, Pa.
 Cave, Henry, Autogeneous Welding Equipment Company, Springfield, Mass.
 Clark, Jno. C. D., People's Gas Light & Coke Company, Chicago, Ill.
 Collins, A. C., Davis Acetylene Company, Elkhart, Ind.
 Davis, Augustine, Davis-Bournonville Company, New York City.
 Doran, H. G., Commercial Acetylene Company, Chicago, Ill.
 Elliott, Richard P., Eco Mfg. Company, Boston, Mass.
 Galbraith, Jas., Union Welding Company, Chicago, Ill.
 Gannett, H. L., Monarch Acetylene Company, Buffalo, N. Y.
 Goodyear, Nelson, 50 Church street, New York City.
 Higgins, Isaac W., Home Carbide Gas Company, Chicago, Ill.
 Jenkins, A. F., Alexander Milburn Company, Baltimore, Md.
 Johnson, Jno. A., Johnson Acetylene Gas Company, Crawfordsville, Ind.
 Malcher, L. M., Western Welding & Mfg. Company, Chicago, Ill.
 Martin, W. P., Union Carbide Company, Chicago, Ill.
 Morehead, J. M., Union Carbide Company, Chicago, Ill.
 Morrison, A. Cressy, Union Carbide Sales Company, Chicago, Ill.
 Moskowitz, M., The Prest-O-Lite Company, Indianapolis, Ind.
 Noble, R. G., Union Carbide Sales Company, New York City.
 Noxon, W. R., Davis-Bournonville Company, New York City.
 O'Shea, Benjamin, Union Carbide Sales Company, Chicago, Ill.
 Ostby, Oscar F., Commercial Acetylene Company, New York City.
 Parker, W. J., electrical engineer, Department of Electricity, Chicago, Ill.
 Plumley, M. Stuart, Linde Air Products Company, Buffalo, N. Y.
 Reasoner, R. B., Brauer Acetylene Lighting Company, Marshalltown, Iowa.
 Rose, Geo., F. C. Sanford Mfg. Company, Bridgeport, Conn.
 Rose, P. A., Acetylene Apparatus Mfg. Company, Chicago, Ill.
 Sadler, F. E., Acetylene Apparatus Mfg. Company, Chicago, Ill.
 Sowers, D. W., Sowers Mfg. Company, Buffalo, N. Y.
 Suscipj, L. G., Union Carbide Sales Company, Chicago, Ill.
 Willis, P. F., Henderson-Willis Welding & Cutting Company, St. Louis, Mo.

A. Cressy Morrison of the Union Carbide Sales Company, through whom the conference was called, was elected chairman. Each section and clause of the proposed code was considered in detail, and agreement reached on all the provisions. It is expected that the rules will be approved by the full Board of Engineers at a meeting to be held next month, but they will not become effective until adopted by the National Board of Fire Underwriters, which meets monthly.

The Recommendations Made

In the main, the proposed code is based on the acetylene house lighting rules which have been in force for a number of years, but liberalized and

broadened, considering that welding apparatus is handled by more experienced men. The new provisions deal chiefly with the design and manufacture of apparatus, but two important rules govern the use of apparatus in places carrying fire insurance.

The compression of acetylene above 15 lb. per square inch is absolutely forbidden, except in cylinders containing acetone saturated asbestos under approved conditions. With a pressure of 24 lb. and a temperature of 538 degrees F., acetylene becomes an extremely violent explosive. Its molecules become disassociated into hydrogen and carbon with a sudden force which makes it a true explosive like nitroglycerine. Below 538 degrees the gas can be compressed to a high degree, and a generator might carry a high pressure for months without any serious results, until some accident raises the temperature to the critical point. A high temperature is also harmless unless the pressure is 24 lb. or higher. Properly used, acetylene is safe. Nearly 200,000 lighting plants are now in use in the United States and accidents are very rare. Acetylene lamps are also used on automobiles, locomotives, &c., with demonstrated safety.

A rule also provides definitely that the capacity of the generator shall be sufficient to furnish gas continuously from one charge of carbide to all blowpipes in use for a working period of at least 5 hours. For carbide feed machines the capacity should be 1 ft. of gas per pound of carbide per hour. With water feed machines, which are likely to develop high temperatures, the rating should not be more than one-half the above. In the old rules governing acetylene lighting, a generator with carbide feed must provide 1 gallon of water for each pound of carbide used in 10 hours. The insurance representatives conceded that generators used in welding, being in more skilled hands, might be allowed twice the old rate of generation, or 1 gallon of water per pound of carbide used in 5 hours.

When acetylene is generated too fast, trouble or danger results. The generator becomes heated, frothing occurs and the pipes become clogged, which interferes with the work. With an extreme overload very hazardous conditions may arise. Instances were mentioned where the generator used was so small for its work that it was charged every hour without removing the sludge. In view of the irregular practices which have prevailed, it was considered remarkable that serious results have not been more common.

The proposed rules cover in considerable detail the quality of hose to be used, the design of blowpipes and fittings and other features in the manufacture of apparatus which will meet with the approval of the underwriters. Tests were arranged for at the Chicago laboratories to determine the design and the factor of safety of tanks used for shipping oxygen.

Hagan Equipment Contracts.—Geo. J. Hagan, furnace engineer and contractor, Pittsburgh, has received a second order from the Youngstown Sheet & Tube Company for six combination sheet and pair furnaces. This order makes a total of 14 furnaces of this type for the company named and rounds out the total number of 280 Bailey combination furnaces in active operation. The American Sheet & Tin Plate Company has placed an initial order with Mr. Hagan for an equipment of Bailey combination sheet and pair furnaces to be installed in the Gary plant. The new furnaces will be used in connection with trial tests on Illinois coal. The Bailey combination furnace is in use in other plants of the American Sheet & Tin Plate Company. The McKeesport Tin Plate Company has recently contracted with Mr. Hagan for the setting of all its tinning pots, with the intention of burning coal for fuel instead of coke. Practical tests showed such excellent results with the new setting and use of coal for fuel that the company has decided to equip its entire tinning house in this manner.

S. DIESCHER & SONS.
 Mechanical and Civil Engineers
 PHILADELPHIA

A New American Radial Drill

The Full Universal Triple-Geared Pattern

The most remarkable tool of its kind yet produced in this country is said to be the new full universal triple-geared radial drill designed and built by the American Tool Works Company, Cincinnati, Ohio. It is exceptionally rigid, accurate in its alignments and economical of power, although capable of the heaviest service. Four sizes are built, having 4, 5, 6 and 7 ft. arms, respectively. The accompanying illustrations are of the 6-ft. size, Fig. 1 being a general view of the working side, Fig. 2 a rear view, showing the construction of the double walled arm, and Figs. 3 and 4

rapidly by a double thread coarse pitch screw controlled by a convenient lever, having marked ears to indicate the proper direction to throw the lever for raising or lowering. Provision is also made against unintentional movement while the arm is clamped to the column. If desired the arm may be rotated through a complete circle by a worm engaging the worm wheel cut in the periphery of its flange. In this way drilling and tapping may be done at any angle, and the arm when once set is firmly clamped in position by four large binder bolts. For convenient setting the arm is graduated in degrees on its periphery and readings are taken at a fixed pointer.

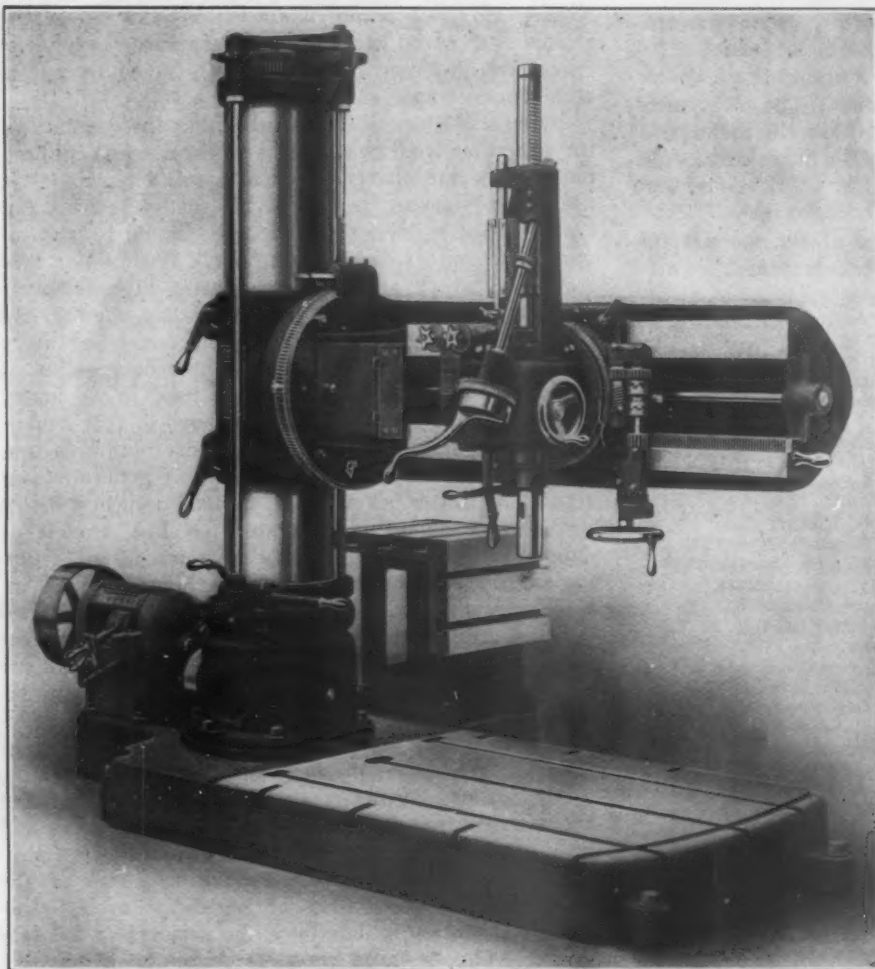


Fig. 1.—The New Full Universal Triple-Geared Radial Drill, Built by the American Tool Works Company, Cincinnati, Ohio.

The head has triple steel gears and is of compact design. Like the arm, it may be swiveled in a complete circle, the motion being controlled by a small hand wheel at the right side, Fig. 4. This hand wheel operates a worm engaging a wheel fixed to the head, which holds it in any desired position, and prevents it swinging around of its own weight when the clamping bolts are loosened. This feature is of advantage in setting the spindle for angular drilling, as the worm wheel holds the head in the desired position, and if changes are desired the hand wheel affords a quicker means than a wrench. Graduations on the head, with reference to a fixed pointer, show the angle at which the head is set, and three binder bolts are provided for clamping it securely at any angle. The same hand wheel that controls the swiveling motion of the head is also employed to move the head rapidly along the arm through multiple gearing and a rack, the change from the swivel-

ing to the traversing movement being accomplished by the engagement of a clutch.

From the saddle shaft power is transmitted through miter gears to a shaft in the front of the head. Spur gears are employed to drive the spindle from this shaft. The latter is offset to one side of the spindle and is mounted in two bearings, one of which is integral with the saddle, and the other with the swiveling head. This is said to eliminate the cramping and consequent loss of power, with its attendant wear. Twenty-four changes of spindle speed are provided through the speed box or cone pulley drive, with a double friction countershaft. These changes range from 19 to 314 rev. per min., advancing in geometrical progression and all are immediately available through levers. A speed plate attached to the arm girdle indicates the speed best suited for the work being done. The spindle is equipped with both hand and power feeds, and also with quick advance and return.

details of the friction for the tapping attachment and the head respectively.

Heretofore the universal radial drill has been incapable of driving high-speed steel drills to the limit of their endurance, principally because of lack of power and springing of the arm. It will thus be seen that rigidity of the arm is very essential, and, as will be noticed from the first two views, the arm of this drill is especially massive. In its design an effort has been made to eliminate every weakness heretofore encountered by making it in the form of upper and lower tube sections, bound together in back by a double wall of metal, and further reinforced by heavy transverse ribbing. Ways are formed on the front to carry an unusually wide and rigid saddle that is firmly locked at any point along the arm by a powerful clamping device, which also binds the double arm sections and the saddle into a compact unit. The arm is clamped to the column by two binder levers, and is raised and lowered

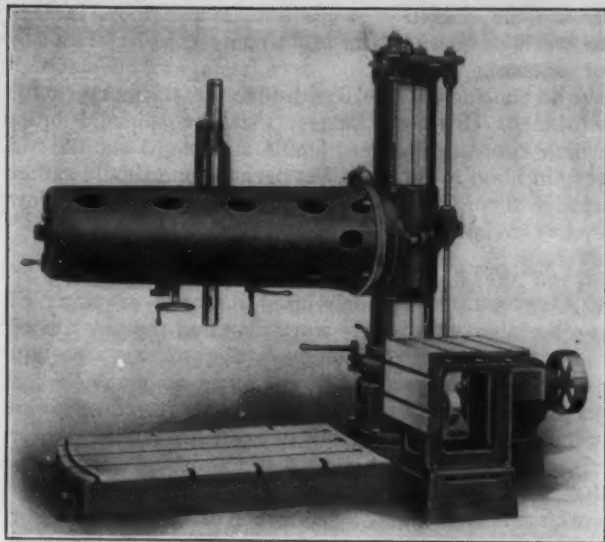


Fig. 2.—Rear View of the New American Radial Drill.

The steel triple gears provide one direct and two reduced speeds through the medium of spur gears and positive clutches, and are operated in the front of the head saddle by a conveniently located lever, without stopping the machine. These gears are mounted on the back of the saddle and are fully inclosed by the upper walls of the arm, thus permitting it to be rotated through a complete circle without possibility of overhanging mechanism interfering with the work being machined. Eight rates of positive geared feed, advancing in geometrical progression from 0.006 to 0.060 in. per revolution of the spindle are provided by the feed mechanism located on the head. The two star knobs at the left of the spindle control the feed mechanism and any one of the feeds is instantly obtained by turning the dial until the one desired is opposite a fixed pointer. The rate of feed being used is plainly indicated at all times, and consequently no reference to index plates is necessary. The feed train is controlled at the worm wheel by a friction clutch and lever, and the latter also controls the quick advance and return of the spindle. The depth gauge and automatic trip have been improved and simplified and the readings are taken on a vertical scale similar to the ordinary machinists' scale. The tripping mechanism is arranged so that the spindle will be tripped at any point within the limits of its travel by setting the trip dog so that the scale reads the depth to be drilled. At the limit of spindle travel the trip also acts automatically to prevent damage to the feed mechanism. In addition to the automatic device the feed can be tripped by hand at any desired point.

The tapping mechanism is mounted on the girdle end of the arm between the triple gears and the speed box, which reduces the weight of the saddle and gives

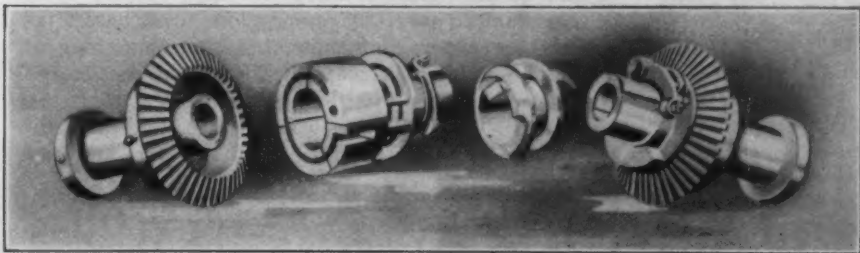


Fig. 3.—The Reversing Gears and Clutches of the Tapping Mechanism.

more room for ample proportions of the parts. The details of the patented double band friction through which this mechanism operates is shown in Fig. 3. The lever for operating this mechanism is placed on the front of the saddle and controls the starting, stopping and reversing of the spindle. Because of the position of the tapping attachment between the speed box and

the triple gears these frictions, which in themselves are very powerful, receive the benefit of the triple gear ratio and have a comparatively light duty to perform. Thus unusually heavy tapping is possible, without undue strain, and the taps can be withdrawn at an accelerated speed. These frictions consist of an internal and external friction combined in one and the mechanism is said to be almost as positive as a jaw clutch. Their power is indicated by the fact that the 4-ft. machine will drive a 6-in. pipe tap and an 8-in. tap can be easily driven by a drill having a 6-ft. arm. Two sets of these frictions are mounted in the tapping attachment.

The column is of the double tubular type, the sleeve or outer column revolving on conical ground and hardened roller bearings. The column may be clamped in any position by the maker's patent V-clamping ring, which may be moved around the stump to the location best suited to the convenience of the operator. When clamped, this ring binds the column sleeve firmly to the inner column, or stump, extending through the entire length of the sleeve and having long bearings for the outer column at both top and bottom. The base is massive and unusually deep, is strongly ribbed

both longitudinally and transversely, particularly at the point where the column is bolted to it, and has large T-slots, with an ample allowance of metal around them.

The speed box is of the cone and tumbler type and provides eight changes of speed, each of which is instantly available by shifting the tumbler lever to the proper notch on the cover of the box. All these feed gears are steel of coarse pitch

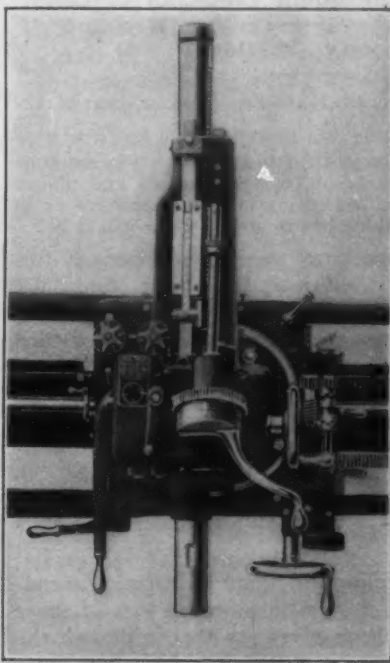


Fig. 4.—A Detail of the Head.

and wide face, and of the Brown & Sharpe 20-degree involute pointed-tooth type, which tests showed is best where gears intermesh broadside. An auxiliary train of gears between the pulley and cone shafts, which is engaged through a friction by lifting the tumbler lever, rotates the cone gears while changing speeds, thus minimizing the shock to the gears. A latch and locking pin hold the tumbler lever and gears securely in their various positions. A cushion in the line of drive is provided between the column and the feed box to absorb shocks and insure long life to the driving mechanism.

The drill may be driven by motor, either directly or through belt, chain or gears;

the last is recommended as most efficient and simple.

In the illustrations the drill is shown equipped with a plain box table 28 in. square on top and having a side surface which is equivalent to an angle plate. If desired, however, a universal table consisting of a swivel base on which is mounted a heavy housing carrying the tilting top of the table can be supplied. This

top can be swiveled to any angle within 90 degrees and either face can be set in a vertical position by a segment and worm operated through a pair of reducing gears. This makes it comparatively easy to swivel the table when carrying a heavy load. While the worm and segment are self-locking in themselves, the top can be clamped securely to the housing by two bolts, thus relieving the worm and segment of undue strain. Graduated dials on both the top and base show the angle at which the table is set.

Renewable bronze bushings are used on all the bearings of this drill and special attention has been paid to the lubricating facilities. All the gears subject to severe duty are steel, the pinions being cut from bar stock and the gears from high grade steel castings. All speed and feed changes and other operations may be easily and quickly accomplished from the front of the machine, as all operating levers except that for the speed box are on the head and the saddle, conveniently accessible.

Wage Payment Systems

How to Secure Maximum Efficiency of Labor

BY JOHN ANDERSON.

In a recent issue of *World's Work* appeared the following warning:

It is time to take thought for to-morrow. It is not time to throw away safeguards of business caution and plunge blindly into excesses, either in markets, in commerce or in manufacturing. Something has to stop. What will it be?

It is of vital importance to every citizen of this country to discover what it is that must stop. We know only that there must be causes for the widespread distress, and we rack our brains to understand and remove these causes. Some there are who lay all the blame at the door of the tariff; still others who vehemently protest that present conditions are the natural accompaniment of human nature (brand of 1910), and there is a small band of us who like to argue that the great wrong of to-day, as well as the great wrong of yesterday, is the misuse of the power of might.

We are quite willing to admit a certain unconsciousness in this habit of misuse on the part of those to whom power has been given, so that, although the responsibility is just as great, there is due them some measure of forgiveness for their ignorance. Yet their short-sightedness, their slavery to custom and their supreme disdain to the thousand evidences of the inevitability of the eternal laws of compensation leave one a bit dumbfounded.

The Prevention of Progress

Hundreds of years ago the Chinese built a wall, primarily to keep out the Tartars. Part of this wall was of stone and earth, so that you can see it to-day if you care to. The rest of the wall was not so tangible, yet both parts proved equally strong and kept out the Tartars, both good and bad, for many centuries. Incidentally, China stood still for those same centuries. There is a moral in this.

Hundreds of thousands of dollars are spent each year in perfecting and manufacturing labor-saving devices and machines. This is an indication that the manufacturer considers economy of labor to be of great importance and worth the investment of large fortunes. Furthermore, inasmuch as the total working class is constantly increasing in numbers, it is evident that, despite the introduction of labor saving devices, labor itself remains still the greatest item of expense the manufacturer has to deal with; his human machines cost him more each year than do his machines of iron and steel. Yet—and here is the glaring inconsistency—he is taking to-day but feeble steps to in-

crease the efficiency of his human machines; in fact, as we hope to show, he is, in many cases, consciously or unconsciously placing or allowing to be placed a bar to the increase in the productive efficiency of his workmen. Strange, indeed, that the splendid brain which controls the great mills and shops should still remain blind to this fact, yet perhaps one should rather admire them for the tenacity with which they follow their convictions.

Methods of Paying Labor and Their Shortcomings

Our two most widely used methods or plans of paying labor are the day work plan and the piece work plan. The former, which pays a workman a certain rate per hour regardless of the exact amount of work performed, is very old and evidently offers no definite inducement to the workman to exert himself to greater effort. The plan makes no distinction and often pays the best workman no more than it does the poorest workman. Moreover, an overseer or other supervisor must be provided to see that each man "earns his pay" by doing an average day's work in 10 hours.

With the piece work plan each worker is paid in accordance with the amount of work performed, and, on the face of it, one would say that this system, by allowing the worker to earn wages in accordance with his ability and his needs, and by giving the manufacturer his goods at a fixed labor cost, was far in advance of the day work plan. That is, where the day work plan offers no inducement to increase in productive efficiency, the piece work plan would seem to offer every inducement.

Unfortunately, it is otherwise. It is in the administration of the piece work system that manufacturers, sooner or later, make their great mistake and overreach themselves, with the result that the system becomes a mockery and the evil conditions of the old day work system reappear. Regardless of the continually increasing cost of living, the manufacturers decide among themselves, for example, that \$1.50 for 10 hours is enough for a woman and that \$2.50 a day is enough for the ordinary workingman with a family. The piece work prices are then adjusted so that the normal day's output will just about bring these wages, and things run on until, either in the endeavor to reduce costs or (and let it be whispered) to reduce some overzealous workman who has been unfortunate (?) enough to earn more than the allowed \$2.50 daily, prices are cut. Immediately throughout the entire shop the news of the cuts is whispered about, with a low voiced warning against overzealousness of the aforementioned type, with the result that there is a general slowing down of all the producers; you might say that a code of punishment now existed in that shop—a code to punish those showing the least sign of increased efficiency.

One may well ask, How much has the manufacturer gained by this general cutting of prices? It is true he can quote slightly lower prices than before, which is important in meeting competition. But has it not been at the expense of something else, something on which the ultimate success of the whole shop rests? Has not more been lost than gained? Was there not some other, some better way of accomplishing the same thing? We of the little band think so, and here is our argument.

What Determines the Success of a Factory

The success of a factory is measured by the efficiency of its management, its men and its machinery.

The efficiency of management is of first importance.

The efficiency of the men is of next importance, and varies with their physical condition and their frame of mind.

The efficiency of machines varies with their physical condition and is of third importance.

Almost the entire attention of those concerned is

given to the betterment of the efficiency of the management and the machinery, while the efficiency of the men themselves is given but meager attention. In fact, a system of wage payment which augments the prevalence of poverty, and instills a spirit of dissatisfaction and hostility through the factories, is tenaciously clung to and persisted in.

The introduction of a wage system which would better the physical condition and build up a co-operative spirit in the working force would at the same time work to the benefit of the manufacturer, and put into his establishment a stability for which he would some day "thank his lucky star." If, therefore, the manufacturer obtains a benefit (greater profits) from a system of wage payment which is continually improving the condition of the workingman, why should he object? Why, indeed, should he not be glad?

Given the piece work plan of wage payment as a basis, what modifications can we make in it to remove its present bad features and change it into a system benefitting both employer and employee alike?

The altruist will tell the manufacturer to simply promise the workers no further price cutting and to allow each producer to receive all he is able to earn at the regular piece work rates, arguing that he (the manufacturer) should be well content with the additional profit he is able to make on the extra output of his mills. Such men as Gantt, Taylor and Emerson do not believe such altruism to be practical, are content to go halfway at the start and have designed their systems accordingly.

Rewarding Workmen for Extra Effort

The systems of these men and others are generally known as the premium or bonus systems, and are based on rewarding (not punishing) the workmen for extra effort. And instead of allowing the workman all that he saves, it is deemed not unfair that he should share half and half with his employers the amount he has saved by his extra efforts. After all, perhaps one should be contented, for the nonce, in having bettered the workman's condition that much. Taking into consideration the motives which actuate the most of us these days, we may feel that a great deal has been done, and consider that the possibilities of the future are yet to be tested.

The three conditions of the workingman under the systems outlined are shown in this table:

	Case I.	Case II.	Case III.
Normal day wage	Present piece work. \$2.00	1/2 and 1/2 premium plan. \$2.00	" Altruistic plan." \$2.00
Wage at 25 per cent. increase in productive efficiency....	\$2.00 (After cut.)	\$2.25	\$2.50
Results to workman..	Discouraged help. No incentive to speed up.	Encouraged help. Incentive to speed up.	Enthusiastic help. Incentive to do utmost.
Results to manufacturer	Labor troubles. Fixed cost of goods. Poor help. High running expenses.	help of better class. Increased production. Cheaper goods. Reduced running expenses.	Greater production. Greater profits. Contented help of best class. Much reduced running expenses.

And now one illustration before we finish.

Let us suppose the total labor spent on an article at regular piece prices is \$2 per thousand pieces, and that the additional cost for operating expenses is \$4 and for the material which went into it is \$2 per thousand; this, with a profit of 25 per cent., will make a selling price of \$10 per thousand. Now, with more efficient labor it is easy to imagine that one-quarter more pieces can be turned out in the same time, and with no appreciable increase in the operating expenses.

At the same piece prices this will net the operator \$2.50 for his work and will give the manufacturer 1250 pieces for \$9 (labor, \$2.50; material, \$2.50, and operating expenses, \$4). These he can sell for \$12.50, increasing his profits from \$2 to \$3.50. That is, the

extra 50 cents earned to the workman by his increase in productive efficiency has earned the employer \$1.50 additional profits.

This is Case III on the table and, one must admit, does not look particularly unfavorable to the manufacturer.

However, as a compromise between this and Case I, there have been evolved the premium and bonus plans of to-day. Under the "half and half" premium plan the foregoing illustration becomes somewhat less favorable to the workman and much more favorable to the manufacturer. For example, the rule being to pay the more efficient workman only one-half what he saves by speeding up, he would receive but \$2.25 for his 1250 pieces, and the additional profit to the manufacturer would be \$1.75; stated briefly, for every extra dollar the man earned by his extra effort, the manufacturer would gain \$7. Not a bad investment, this premium system. It betters the workingman's condition materially and, best of all, improves his frame of mind.

Now, then, is it not true that the present system of wage payment, rigidly insisted upon by those who have the power, is causing distress? And does it not look like "good business" to change this system to Case II, if Case III strikes one as quite too radical?

And if, in your establishment, Mr. Manufacturer, you have a number of \$3 men who, you insist, shall not earn (or show that they can earn) more than \$2, are you not somewhat in the position of the man who plants only two-thirds of his acreage, or who puts up a one-story office building on lower Broadway?

Labor Conditions in the Steel Industry

A protest was made at Washington May 10 to Secretary Nagle of the Department of Commerce and Labor and to Charles B. Neill, Commissioner of Labor, by President C. M. Schwab and other representatives of the Bethlehem Steel Company against the report recently made by the Bureau of Labor on wages and working conditions at the Bethlehem Steel Company's works. The protest particularly emphasized the fact that most of the skilled workmen at the Bethlehem plants have a Saturday half holiday; also the failure of the Bureau of Labor report to state that the conditions as to hours of labor found at South Bethlehem are not peculiar to that plant, but are general in the steel industry. In view of this protest Commissioner Neill has made public a statement referring to the Saturday half holiday at South Bethlehem, and commenting upon the hours of labor generally required at blast furnaces and steel works. The commissioner says that the annual reports of the Bureau of Labor show that at blast furnaces 84 hours a week has been the working time throughout the United States. As blast furnace work is necessarily continuous, requiring 24 hours a day operation seven days in the week, he considers that three shifts of eight hours each offer the only plan of relief. He adds that the reports of the Bureau also show that at steel works a 12-hour day for six days a week is not uncommon, and that in some departments, aside from those which necessarily require seven days operation, the six-day week has been lengthened in many instances into a seven-day week, with 12 hours labor a day. The commissioner adds that the Bethlehem Steel Company statement shows \$727.11 to be the average of wages paid to all employees in 1909, and that the company invites comparison of this figure with the average wages in other similar plants.

The regular monthly meeting of the Eastern Pig Iron Association will be held at Hokendauqua, Pa., May 19. The members of the association will then be the guests of the Thomas Iron Company.

Case Hardening*

Some Recent Investigations with Different Carburizing Compositions

BY SYDNEY A. GRAYSON, BIRMINGHAM, ENGLAND.

The present investigation was chiefly undertaken to find out, as precisely as possible, the percentage of carbon as it is diffused into the steel by the use of different compositions, and the effects produced with each composition at different carburizing temperatures.

A good case hardening steel of the following composition was used:

	Per cent.
Carbon	0.170
Manganese	0.704
Silicon	0.056
Sulphur	0.060
Phosphorus	0.047

Case hardening compositions may be divided into two classes—those in which the carbon is present either as gaseous hydrocarbon or in a form from which gaseous hydrocarbon can be produced (in either case the hydrocarbons have to be decomposed before the carburizing of the iron begins) and those in which the carbon is present chiefly in the form of fixed carbon.

For this investigation four commercial compositions were taken, two from class 1 and two from class 2. These are being used constantly in every day practice for case hardening and are made by well-known firms. They were analyzed and afterward subjected to tests, the results of which are summarized in the following pages. A composition should contain a high percentage of carbon in a state so that it may be freely imparted to the iron or steel. This

matter and hydrocarbons were estimated at 1000 degrees C., to show the percentage at the working temperature.

The analyses of the compositions used are tabulated as follows:

	Class I.		Class II.	
	Bone. Per cent.	B. scintilla. Per cent.	Charred leather. Per cent.	Hardenite. Per cent.
Carbon	8.0	11.0	69.0	44.0
Volatile matter and hydrocar- bons	26.5	53.0	15.2	14.1
Nitrogen	3.5	3.0	3.8	0.9
Ash	60.0	23.5	3.5	37.5
Sulphur	0.1	0.45	0.55	Trace
Moisture	2.0	9.0	8.0	3.5
Totals	100.1	99.95	100.05	100.0
Phosphoric acid	16.0	2.0	0.10	Trace
Also present...	Alumina. Lime. Ammonia.	Ammonia. Lime. Alumina. Soda.	Alumina. Lime. Iron. Silica.	Barium. Iron (trace). Silica. Carbonates.
	Silica and carbonates.

The materials or compositions used are crushed

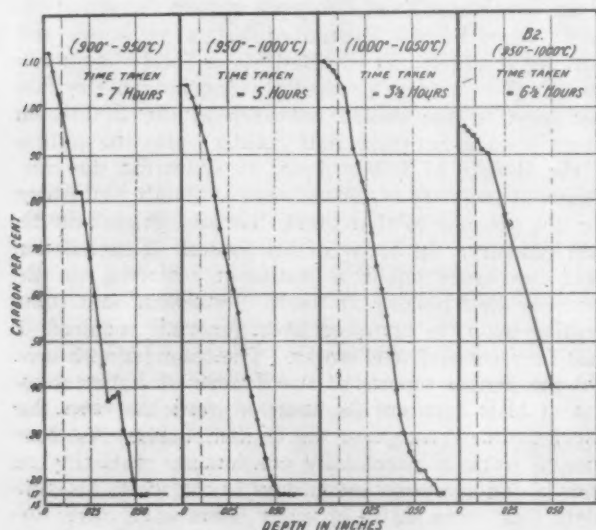


Fig. 1.—Curves of Carbon Diffusion Using Crushed Bone Carburizing Material.

carbon should exist chiefly as fixed carbon, although it is essential that some hydrocarbons or nitrogenous matter be also present to act as carriers of the carbon and to create a more active carburizing atmosphere in the box. At the same time the impurities, such as sulphur and moisture, must not be lost sight of, as these have a far greater ill effect than might possibly be expected.

The author might add that the analyses given are the mean results, because these compositions generally vary on samples taken from different parts of a 1-cwt. bag, so an average sample was taken. The volatile

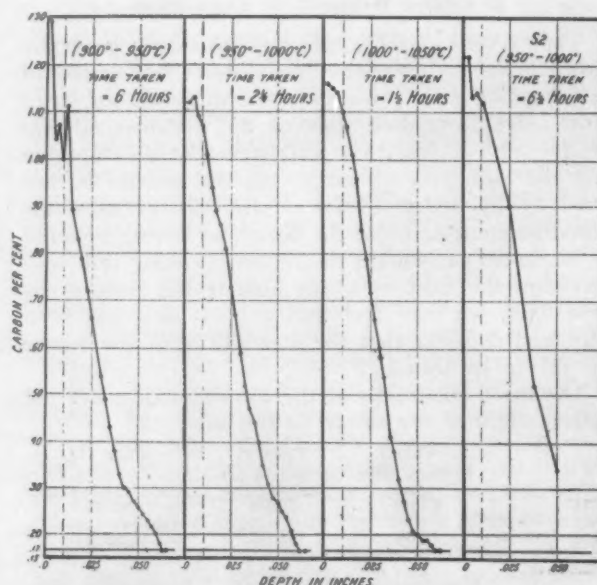


Fig. 2.—Curves of Carbon Diffusion Using Brown Scintilla Carburizing Material.

bone or B and Brown Scintilla or B. S., which represent class 1, and charred leather or C. L., and hardenite, H, representing class 2. It will be noticed that class 2 contains a greater amount of fixed carbon than class 1, but class 1 contains the larger amount of volatile hydrocarbons, although the total active material or total carburizing matter for each of the respective compositions is practically:

	Per cent.
B	38
B. S.	67
C. L.	88
H	50

The results for the fixed carbon were first obtained by estimating the carbon by combustion and afterward checked by the difference shown according to the percentage of volatile hydrocarbon matter and the total combustible matter. Sulphur when present in such a quantity as in this charred leather is likely to produce deteriorating effects.

Moisture, when present in amounts over about 12

* From a paper presented before the Iron and Steel Institute at London, England, May 4 and 5, 1910.

per cent., causes a rough surface to be produced on the work to be case hardened. This action appears to be intensified by the presence of sulphur, which is no doubt owing to the formation of acidified gas or steam. If the moisture is present to the extent of about 30 per cent., as the author has sometimes found it, this action is extremely severe, and the case hardened work is pitted and scaled so thickly that it is rendered absolutely unfit for use.

The effect of nitrogen (in combination as cyanogen) has been dealt with fairly exhaustively by recent workers, the latest results being those of Charpy and of Olsen and Weiffenback. Charpy* made experiments in an atmosphere of carbon monoxide, together with cyanides, and also in an atmosphere of the same gas, but devoid of nitrogen, the result of which indicated that the presence of cyanides was not essential in case hardening, and that the case hardening is produced chiefly by the gases evolved by the case hardening agents. Olsen and Weiffenback's investigation† dealt with the effective power for case hardening of the following gases—illuminating gas, acetylene and carbon monoxide.

Experiments were carried out with each gas alone and also mixed with ammonia in definite amounts. The results showed that the presence of ammonia facilitates the case hardening in all cases except that of carbon monoxide, which acts as well without it as with the ammonia treatment. Of the three gases studied, they found the carburizing efficiency to be in the following order: Carbon monoxide, acetylene,

ilar to that used by Dr. Guillet in some investigations and also by Shaw Scott,* because this mixture consists of about 40 per cent. of barium carbonate and 60 per cent. of charcoal. The chief action of the barium carbonate seems to be due to the decomposition which takes place when this substance is heated in the presence of charcoal, yielding barium monoxide and carbon monoxide, the reaction being



The carbon monoxide then takes a direct part in the carburizing.

Diffusion of the Carbon and the Effect of Carburizing Temperature on Each Composition

The efficiency of the carburizing material is not dependent entirely on its speed of carbon penetration, but also, and essentially, upon the effect it produces on the percentage of carbon as it is absorbed by or diffused into the iron or steel. With normal case hardening the percentage of carbon in the case or carburized zone should be equal to the eutectoid or saturated steel containing 0.9 per cent. carbon, but Figs. 1, 2, 3 and 4 show what has actually taken place in practice. The method adopted to obtain the data illustrated by these curves was as follows:

Bars of steel $1\frac{1}{4}$ in. in diameter by 12 in. long, and of the composition previously given, were taken and turned down to $1\frac{1}{8}$ in. in diameter and ground to remove the tool marks. The bars were then marked and packed in their respective compositions, along with test pieces to gauge the depth of carburizing, and put into the furnace. The boxes were then heated to the required temperature and when they were thoroughly soaked through at that temperature the time was noted and the furnace kept steady until the required depth of case (1-16 in.) had been obtained by each composition, the time when each box was pulled out being again noted.

The pieces belonging to each of the four composi-

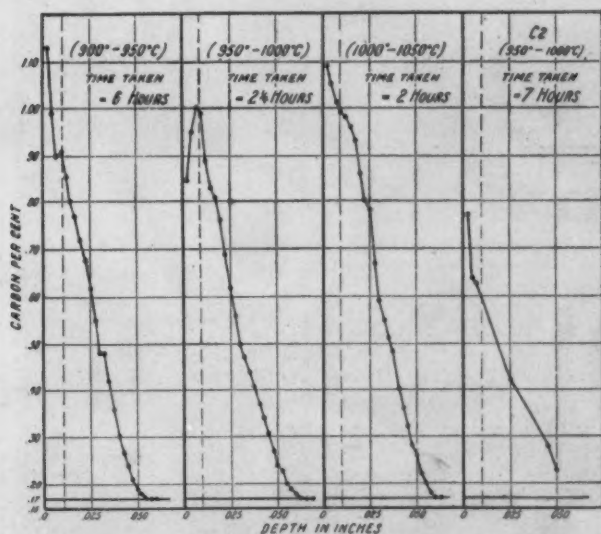


Fig. 3.—Curves of Carbon Diffusion Using Charred Leather Carburizing Material.

methane. They therefore concluded that carbon monoxide is the best for this purpose, as no ammonia seems necessary, and it gives the best penetration in the same time. A higher percentage of carbon in the case was obtained in practically every experiment when ammonia was used than where it was not used.

The nitrogen in the compositions used for the present paper was estimated by a modified form of Kjeldahl's method, as given by Brearley and Ibbotson.‡ The other substances which are also present were determined to show of what the compositions consist, apart from the carbon and hydrocarbons, because the action of these secondary substances seems to be of some importance.

The B. Scintilla material when heated fuses slightly and the effect of this seems to be that the gaseous carbon is retained in the box and consequently the carburizing action is much quicker.

The "hardenite" material is a mixture very sim-

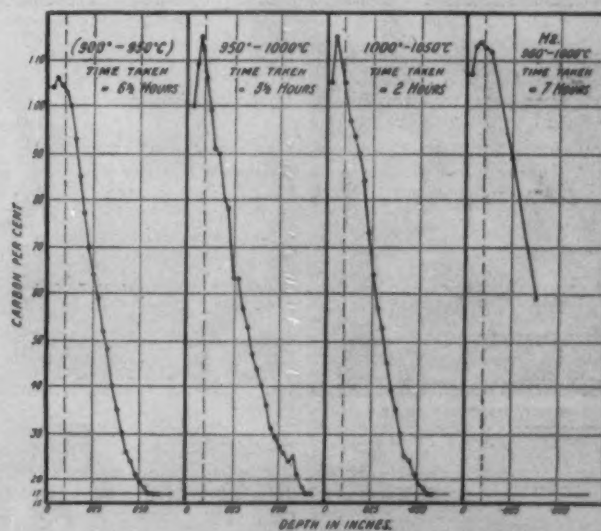


Fig. 4.—Curves of Carbon Diffusion Using Hardenite Carburizing Material.

tions were all carburized together at their respective temperatures, so that each composition should be used as nearly as possible under exactly similar conditions.

The furnace used was of the direct fired pattern, but of such construction that a very uniform heat can be maintained for a long period. It was controlled by two pyrometers of different patterns as a check on each other, the electric resistance and Fery radiation pyrometers being used. A range of 50 degrees is given for the variation in the temperature of the boxes, although it was never more than 30 degrees and, generally speaking, less than this. Naturally the

* *Revue de Metallurgie*, Memoirs, Vol. VI., pp. 505-518.

† Transactions of the American Institute of Chemical Engineers: *The Iron Age*, July 8, 1909.

‡ "Analysis of Steel Works Materials."

* *Journal of the Iron and Steel Institute*, 1907, No. III, p. 120.

carburizing was carried out under good practical conditions to show results obtained in practice.

After the boxes were removed and the pieces cooled off, the latter were taken out and the black skin cleaned off by polishing, then, after insuring that the lathe machined perfectly parallel, a piece was put in and a very fine cut taken, which removed only 0.005 in. of the diameter or 0.0025 in. depth at each cut. In each set of cuttings, of which there were about 30 to each piece, the carbon was afterward estimated by the combustion method and the results plotted, using the depth of penetration in inches as the abscissæ, with the carbon per cent. as ordinates, thus obtaining the diffusion curve. The depth of penetration throughout this series was kept as constant as possible, so that the results are made more readily comparable, with special regard to the time taken and the curve obtained.

Fig. 1 shows the diffusion curves obtained at the different temperatures, and also the time taken at each temperature when using the bone material. The time given is actual soaking or carburizing time. The line at 0.17 per cent. carbon, which runs parallel with the base line, represents the percentage present in the normal steel or core.

A case hardened part in practice is used either directly after the case hardening operation or after it has been ground, so that it is important to note what the carbon percentage is after grinding. Usually about 0.020 in. is left on the diameter for this operation, which is equivalent to 0.010 in. deep; this is represented by the dotted lines running parallel to the ordinates.

The results shown on Fig. 1 are summarized in the following table:

Temperature. Degrees C.	Time taken. Hours.	Carbon edge. Per cent.	Carbon after grinding. Per cent.
900- 950.....	7	1.12	0.99
950-1000.....	5	1.05	0.96
1000-1050.....	3½	1.10	1.065
B2 950-1000.....	6¼	0.96	0.93

B2 represents this bone material, which has been previously used at 950 degrees C. and is now used again at 950 to 1000 degrees C.; the time of penetration taken is good considering that the new material takes five hours at the same temperature. The reason why this works so well a second time may be that the first operation having decomposed some of the hydrocarbons, the carbon is now in a better state for carburizing. The comparison shows that the

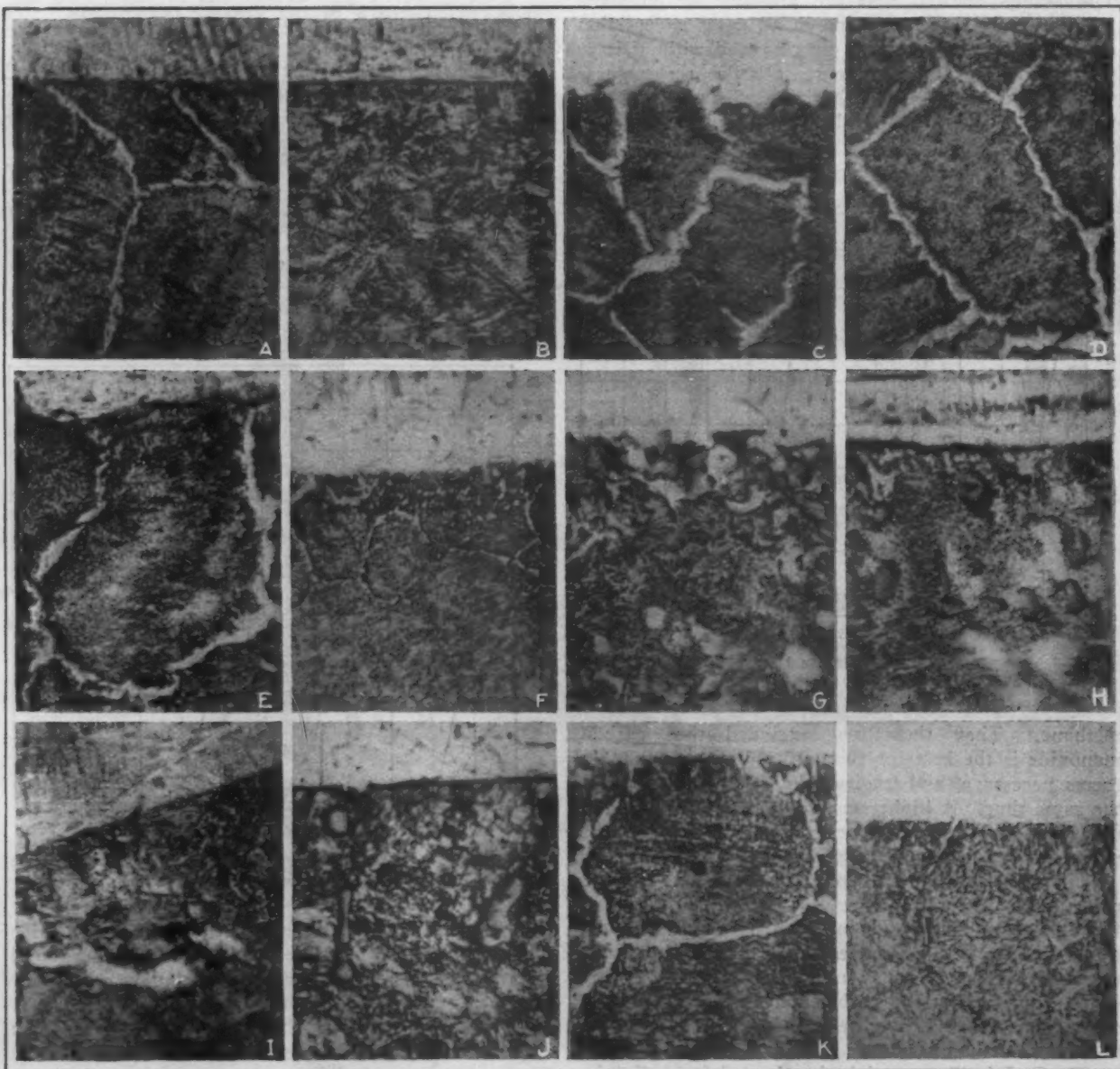


FIG. 3.—MICROGRAPHS OF THE EDGES OF PIECES CARBURIZED AT VARIOUS TEMPERATURES WITH DIFFERENT MATERIALS—MAGNIFIED 500 DIAMETERS.

A, carburized at 950-1000 degrees C. with bone; B, the same but afterward reheated to 750 degrees and quenched at 20 degrees C.; C, carburized at 900-950 degrees C. with Brown Scintilla; D, the same at 950-1000 degrees C.; E, the same at 1000-1050 degrees C.; F, the same as D but reheated to 750 degrees and quenched at 20 degrees C.; G, carburized at 900-950 degrees C. with charred leather; H, the same at 950-1000 degrees C.; I, the same at 1000-1050 degrees C.; J, the same as H but reheated to 750 degrees and quenched at 20 degrees C.; K, carburized at 950-1000 degrees C. with Hardenite; L, the same but reheated to 750 degrees and quenched at 20 degrees C.

best curves are obtained at 950 to 1000 degrees and 1000 to 1050 degrees, although at the latter temperature the action is considerably quicker.

The micro-sections were taken from the end of the carburized bars from which the cuttings were taken, one end of each piece being left unmachined so that the micrographs should correspond exactly with the curves obtained. Some difficulty was experienced in keeping the edge for examination perfectly level during the polishing, and to overcome this an electrodeposit of copper was put on each section to back up the edge; this is accomplished very well. The etching reagent used throughout was a 5 per cent. solution of picric acid in alcohol. The magnification was 500 diameters. A, Fig. 5, is the micrograph of the edge of the piece carburized only at 950 to 1000 degrees in this bone material. It consists of two parts. The lighter area is the copper deposit, while in the carburized area cementite borders are shown surrounding pearlitic areas. B, Fig. 5, is another section of the same bar carburized at the same temperature and afterward reheated to 750 degrees C. and quenched in water at 20 degrees C., the result being that a pure martensitic structure is produced.

Fig. 2 gives the curves obtained with the brown Scintilla material, and also the time taken. The results are summarized thus:

Temperature. Degrees C.	Time taken. Hours.	Carbon edge. Per cent.	Carbon after grinding. Per cent.
900-950.....	6	1.29	1.00
950-1000.....	2½	1.12	1.07
1000-1050.....	1½	1.10	1.10
S2 950-1000.....	6½	1.22	1.12

The best curve is that obtained at 1000 to 1050 degrees C., the carbon penetration also being at a quicker rate.

The abnormally high carbon of 1.29 per cent., ob-

previous one, the only difference being that the cementite borders are a little larger. F, Fig. 5, is the hardened section of the piece carburized at 950 to 1000 degrees C. Cementite borders just show on the edge, but with martensitic areas. The section was reheated to 750 degrees C. and quenched in water at a temperature of 20 degrees C.

Fig. 3 consists of the curves obtained with charred leather material, thus:

Temperature. Degrees C.	Time taken. Hours.	Carbon edge. Per cent.	Carbon after grinding. Per cent.
900-950.....	6	1.13	0.91
950-1000.....	2½	0.85	0.90
1000-1050.....	2	1.00	0.98
C2 950-1000.....	7	0.77	0.59

The most uniform curve is produced at 1000 to 1050 degrees C., and at this temperature carburization is also the quickest. There is a sudden rise in the curve produced at 950 to 1000 degrees, this being evidently a decarburizing effect, which is confirmed by the micrograph, H, Fig. 5. With regard to C2, the percentage of carbon is lower than usual when using charred leather, but this is the result obtained under the present conditions.

Sulphur Diffusion

The micrograph of the pieces carburized by this charred leather material present a particularly interesting feature in the form of sulphur diffusion. On analysis of this material, 0.55 per cent. of total sulphur was found to be present. The chief and effective part of the sulphur exists as sulphide or organic sulphur. On examining G, Fig. 5, which is the micrograph of the edge of the piece carburized at 900 to 950 degrees C. in this material, it will be noticed that on the edge there are present, in large quantities, sulphide of manganese, also sulphide of iron with ferrite crystals intermingled. That this is sulphide was proved by a silver print and also later by analysis. The sulphide in this piece exists in the first 0.0025 in. and the result of the analysis shows 2.10 per cent. of sulphur increase.

H, Fig. 5, is the micrograph of the piece carburized at 950 to 1000 degrees. It will be again noticed that the sulphide is present, although not saturated to such an extent as in the previous photograph. This can be accounted for by the fact that at this higher

heat, 950 to 1000 degrees C., a greater proportion of the sulphur will volatilize with the hydrocarbons and consequently weaken the diffusing action. At the same time the sulphur at this temperature has diffused further into the steel, although it still practically exists in the first 0.0025 in., the result of analysis showing an increase of 0.88 per cent. sulphur. The slightly decarburized edge shown in the diagram at this temperature, 950 to 1000 degrees C., is also substantiated by this photograph.

I, Fig. 5, is the edge of the piece carburized at 1000 to 1050 degrees, the sulphide being again present, but not in such a large proportion; thus the higher temperature has volatilized still more of the sulphur from the carburizing material. In this case the sul-

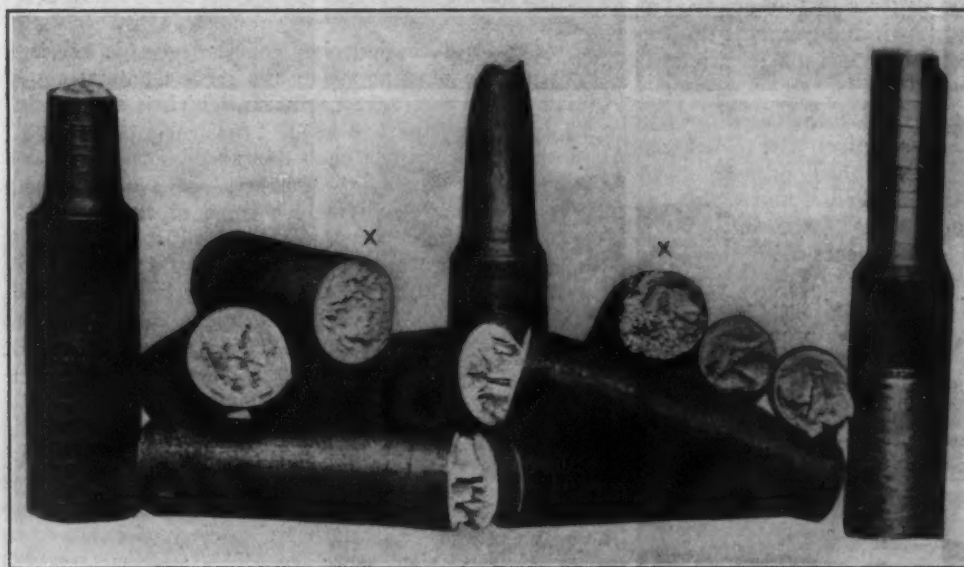


Fig. 6.—Fractured Pieces of Case Hardened Mild Steel.—Pieces Marked X Show Poor, and the Others Good, Heat Treatment.

tained at 900 to 950 degrees, is fully confirmed by the micrograph, C, Fig. 5, which shows the edge to consist of cementite. In the graphite tests only a trace of it was shown, although during the examination of this edge it was found that there were places where this cementite edge was not so prominent, or even present; at the same time the cementite borders were usually present. Further examination helped to substantiate the irregularity of the carbon which is shown in the diffusion curve.

D, Fig. 5, is the micrograph of the edge of the piece carburized only at 950 to 1000 degrees C., showing cementite borders surrounding pearlite areas. E, Fig. 5, shows the edge of the piece carburized at 1000 to 1050 degrees. The structure is very similar to the

phur has diffused to about the same depth as the previous one, at 950 to 1000 degrees C., but in a more dilute state. The sulphur increase is 0.560 per cent.

J, Fig. 5, is the piece carburized at 950 to 1000 degrees, then afterward reheated and quenched at 750 degrees C. in water at 20 degrees C. In reheating the sulphide tends to ball itself up, and, if anything, diffuse farther in. This sulphur diffusion is indeed serious, because when the surface is saturated, as in the piece carburized at 900 to 950 degrees, it tends to produce a soft skin, and even if present in smaller proportions will weaken the structure considerably, thus making it very chippy, consequently causing two effects which must essentially be avoided in any case hardened work.

Fig. 4 consists of the results produced by the Hardenite material, thus:

Temperature. Degrees C.	Time taken. Hours.	Carbon edge. Per cent.	Carbon after grinding. Per cent.
900-950.....	6½	1.04	1.03
950-1000.....	3½	1.00	1.06
1000-1050.....	2	1.05	1.05
H2 950-1000.....	7	1.07	1.13

In studying this diagram it will be seen that a slight decarburization is produced on the edge of each of the pieces carburized in this material, with the exception of the piece at 900 to 950 degrees C., and it is at this latter temperature that the most uniform curve is obtained.

K, Fig. 5, is the micrograph of the piece carburized only at 950 to 1000 degrees C. in Hardenite material, and consists of the cementite borders surrounding the pearlite areas. It does not show the slight decarburization taking place on the surface of this piece, but this is probably due to it containing 1 per cent. carbon even on the extreme edge.

L, Fig. 5, shows the microstructure of the piece carburized at 950 to 1000 degrees in this material and then reheated to 750 degrees C. and quenched in water at 20 degrees C.; the result is that a martensitic structure is produced, although this is rather coarse.

Fig. 6 is a photograph of some fractured pieces of mild steel (analysis previously given), case hardened, and illustrates some good and bad subsequent heat treatment. The two pieces marked X, and which have broken short with a crystalline fracture, show the bad treatment and the other pieces with the fibrous fracture the good heat treatment.

The following tensile and bend test results show the alterations in the mechanical properties of the steel by case hardening:

	Untreated.	Case hardened.
Dimensions of specimens, inches....	0.798 × 2	0.798 × 2
Elastic limit (tons per sq. in.)....	23.8	34.2
Maximum stress (tons per sq. in.)...	32.6	43.0
Elongation per cent. in 2 in.....	40.0	8.0
Remarks—	Fibrous cup fracture.	Fibrous core with fine crystalline edge 1/32 in. deep.
Cold bend degrees (round section)...	180 in.	45°

Conclusions

In the light of the foregoing results, it appears fairly evident that it is necessary to classify case hardening compositions both by the carbon per cent. obtained in the case, and also by the graduation of the carbon diffusion, which is best shown graphically. This classification is necessary on account of one composition being more suitable for certain kinds of work than another. A case of as high as 1.10 per cent. carbon would be very efficient for work where the pressure was fairly constant, such as a plain bearing, but it would be very unsuitable and inefficient for parts which had to resist repeated shocks, because of the strong tendency of the high carbon case to chip or even to peel off. Consequently it is advisable, where all kinds of case hardening have to be done, that two compositions be used—one of them to produce a high

carbon wearing surface and the other to produce a medium carbon wearing surface.

On the other hand, for a composition to be used for general purposes, it should produce a wearing surface containing a percentage of carbon equal to that of the eutectoid 0.9 per cent., to give the most efficient results.

The evidence obtained from the foregoing results respecting the carburizing temperature shows that the best temperature is 950 to 1000 degrees C., although the high temperature 1000 to 1050 degrees can be used with advantage in some cases. The results obtained at 900 to 950 degrees C. tend to show that, although there is an active carburizing atmosphere produced in the box, the temperature of the steel is only high enough to allow of a slow diffusion of the carbon, consequently supersaturation of carbon takes place at the surface of the steel. The diffusion of the sulphur seems to proceed in a similar way to that of the carbon at the temperature of 900 to 950 degrees C. and 950 to 1000 degrees C.

All charred leather material does not contain this active amount of sulphur, although this sample was obtained from a well established firm, and was used in this investigation to find out, if possible, the cause of a soft skin, which was always produced under certain conditions of this material, of which this sulphur diffusion is the most probable explanation.

The B. Scintilla material contains a fairly large amount of sulphur, and which exists chiefly in the sulphide form, although it does not seem to act by any means as keenly as the sulphur in the charred leather material. This is most probably due to Scintilla material having a high percentage of volatile hydrocarbons, which carries off the effective part of the sulphur with it.

The Pennsylvania Engineers' Convention

The Engineers' Society of Pennsylvania has issued a tentative programme of the second annual convention of Pennsylvania engineers, which is to be held at Harrisburg, June 1 to 4. The programme provides for business sessions on each day and for the delivery of lectures or the reading of papers. It is stated that the list of speakers will include some of the leading engineers of the country. At the business meetings the question of an engineers' code of ethics will be discussed, a joint committee of the four large engineering clubs and societies of Pennsylvania having had this matter under consideration during the year, and their report will be presented at this time.

In connection with the convention an industrial exhibit will be made. The hall in which it will be held is 75 × 360 ft., divided into 77 booths. The exhibits will cover all kinds of engineering features, including tools, materials and instruments. J. V. W. Reynders is president of the Engineers' Society of Pennsylvania and E. R. Dasher, secretary. The headquarters of the society are in the Gilbert Building, Harrisburg.

The American Blower Company, Detroit, Mich., will have ready for distribution at the convention of the American Foundrymen's Association at Detroit, June 5 to 10, a handsome book, entitled "Blower Equipment for the Modern Foundry." The work embodies a treatise on foundry heating and ventilating by F. R. Still. A section is devoted to the driving of cupola blowers by direct connected electric motors. Several applications of exhaust fans and ventilating apparatus are illustrated. An interesting comparison of the generating of electric current by isolated electric light and power plants with the purchase of current from central stations is worked out. The company is prepared to supply copies free of charge to those interested.

A Heavy Pattern Lincoln Miller

A Double-Head Machine of Unusual Size Built by the Hendey Machine Company

The double-head Lincoln milling machine shown in the illustrations is notable for the unusual size in that type of machine and its double equipment of milling spindles. Fig. 1 is a view of the front or working side, and Fig. 2 a rear view. In the construction of the

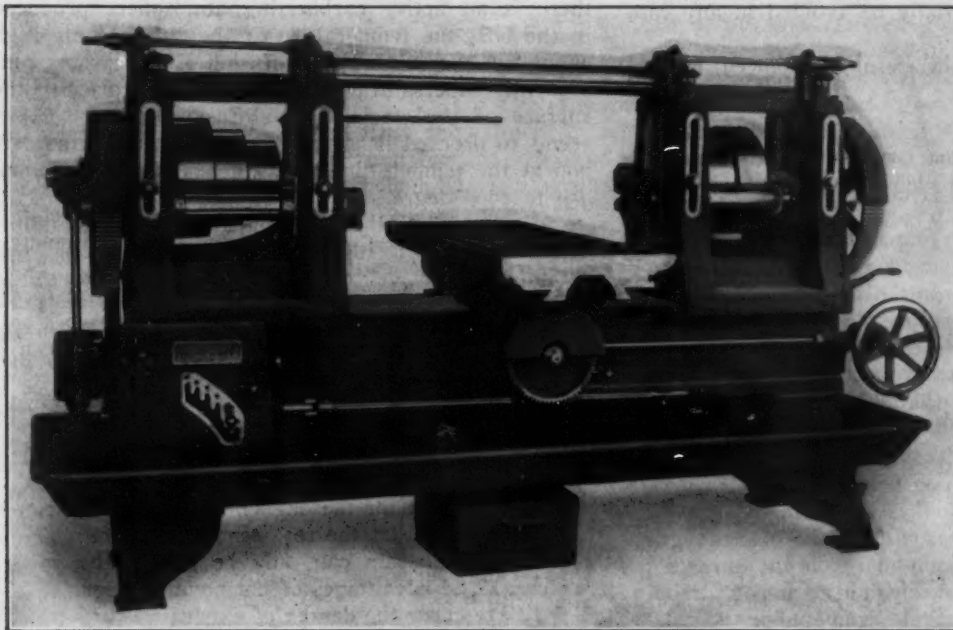


Fig. 1.—The New Heavy Double-Head Lincoln Milling Machine, Built by the Hendey Machine Company, Torrington, Conn.

headstock, saddle, table and feed details the machine does not vary from the No. 8 single-head machine of its builder, the Hendey Machine Company, Torrington, Conn., which was described in *The Iron Age* February 9, 1909. The most material difference is the substitution of a second head in place of the usual tailstock or outboard spindle support.

The right head is adjustable, and the maximum distance between the heads is 15 in. with a 62-in. bed, 23 in. with a 70-in. bed, 28 in. with a 75-in. bed, 36 in. with a 83-in. bed, 42 in. with an 89-in. bed and 50 in. with a 97-in. bed. The distance between the spindle noses for the various sizes of bed are respectively 9, 17, 22, 30, 36 and 44 in. The adjustment of the head or the table in line with the spindle, with a 15-in. table, is $6\frac{1}{2}$ in. on the 70-in. bed, $11\frac{1}{2}$ in. on the 75-in., $19\frac{1}{2}$ in. on the 83-in., $25\frac{1}{2}$ in. on the 89-in. and $33\frac{1}{2}$ in. on the 97-in. bed. With a 20-in. table the adjustments for the various beds are 3, 8, 16, 22 and 30 in., respectively. In other dimensions the machine is of the same size as the No. 8, single-head, Lincoln milling machine, built by this company.

Pen and Sunlight Sketches of Richmond

The American Illustrating Company, Ebel Building, Richmond, Va., has issued under the above title a 168-page book. It treats of the strategic position occupied by Richmond as a trade center, sets forth the transportation facilities and natural resources of the section tributary to that city, presents numerous illustrations of historical buildings and public institutions, gives views of picturesque portions of the city, and includes sketches of numerous manufacturing and commercial establishments, together with portraits of prominent business men. Among the companies and firms receiving marked attention are the following. Gordon Metal Company, dealer in sheet metal and bar iron; Virginia Blower & Heater Company, manufacturer of blower and exhaust systems for all purposes; Call-Watt Company, manufacturer of plows and road machinery; Victoria Metal Company, manufacturing and jobbing tin and other roofing material; Richmond Stove Company, manufacturing cooking and heating stoves and ranges; Boyd Iron Works, manufacturing struc-

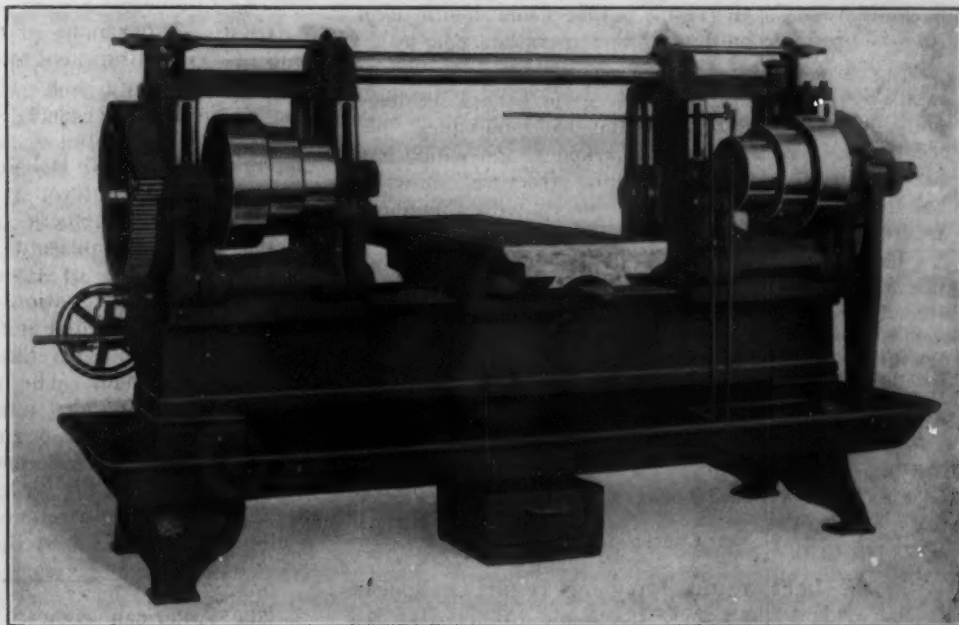


Fig. 2.—A Rear View of the Double-Head Lincoln Milling Machine.

tural and architectural iron work; J. S. Cruickshanks, manufacturing architectural iron work; Mayo Iron Works, manufacturing machinery; B. A. Berger Mfg. Company, manufacturing steel specialties, mainly for plumbers and steam fitters.

The Columbia Steel Company, Elyria, Ohio, manufacturer of cold-rolled strips and sheets, has opened an office at 706 Marquette Building, Chicago, for the sale of its product in that district, and has placed in charge H. L. Hanson, who has been connected with the company's mill for some time.

Rolling Mill Steam Engines*

Modern Types Show Much Better Results Than Those of Previous Years with Which Electric Drives Are Usually Compared

BY EDUARD G. SEHMER AND DR. R. DRAWE, SAARBRÜCKEN, GERMANY.

The standard by which the merit of any machine must be judged is in all cases that of its total efficiency, in the widest sense of the word. This may be regarded as made up of the following factors arranged in the order of their importance: Reliability in working, continued economy during working, low maintenance costs, with as few stoppages for repairs as possible, capability of starting at short notice, and long life. Another consideration to be taken into account is that the cost of installation should bear a reasonable proportion to the capacity of the engine.

One direction in which improvement may always be made is the reduction in fuel consumption. The cost of fuel forms a large item in the total cost of energy developed in engines, especially in those of iron works. As it is unlikely that any decided fall in the price of coal will ever occur, but that rather it will continue to rise gradually, as experienced in the past, it is more than ever a pressing problem for engineers to construct engines working on the most economical principles.

Gas Engine Economies

At the present time the saving in fuel due to gas engine driving is astonishingly large, being estimated to amount, in Germany alone, to about \$7,500,000. The constructive development of the gas engine is now, however, complete, the modern standard type which best fulfils the requirements in iron works being the 3000-hp. engine, with two cylinders arranged tandem, although where larger powers are required no difficulty is experienced in supplying gas engines in single units up to 8000 hp.

The remarkable economy in fuel achieved by the use of the gas engine led to endeavors to adopt it as the sole source of power in iron works, and where its direct application was impracticable it was attempted to drive by electricity generated by gas engine power. In attempting to take advantage of the lowest possible fuel consumption the consideration of total efficiency, taking account of the other factors mentioned above, was lost sight of. These factors, however, are largely influenced by local conditions and play an important part.

A typical instance of this nature is the driving of rolling mills. Until the time when the problem of generating electricity by means of gas engines was successfully solved, it was the universal practice to drive reversing rolling mills with reversing steam engines which, in their original form, were great steam eaters. Shortly before the idea of driving rolling mills electrically took practical shape, however, the lines upon which economy in steam consumption could be improved had become generally recognized, but, as economically working engines were comparatively rare, the comparative calculations of performances of steam *versus* electric driving apparatus were usually based, in the case of steam driving, upon engines of the most uneconomical type; hence it was claimed that the superior economy of the electric driving was proved. Now that a large number of economical steam reversing engines is installed a totally different aspect is presented, which it is proposed to discuss in this paper.

Requirements of Reversing Mill Service

In the first place it is necessary to set forth the requirements which a good steam reversing mill engine

should possess, and to consider the means by which these requirements can be practically fulfilled. Ease of manipulation, reliability and efficient utilization of the steam are the special points by which the total efficiency of a reversing rolling mill engine may be judged. In particular, the engine must fulfill the following conditions:

1. The engine must be capable of starting easily in any position, and must grip the material to be rolled at a regular and moderate speed.
2. When running slow, that is, at starting and stopping, the engine must not stick under an increasing load, or race as the load falls off.
3. In rolling down, that is, during the period of greatest energy consumption, the engine must work as economically as possible, with a minimum steam consumption.
4. When the billet has left the rolls, the engine must be quickly brought to rest.

The primary consideration is that the engine must be capable of such rapid control that the mill shall never have to wait for the engine. Experience, meanwhile, has shown that the requirement as to minimum consumption of steam can only be fulfilled by compounding. The advantages of compounding consist in the ability to carry the degree of expansion further, in decreasing the amount of temperature drop in the cylinders, in the reduction of steam loss due to leakages and in obtaining a more perfect condensation.

The first compound reversing rolling mill engines only partly fulfilled these desired attainments, and the advantages which it was hoped to achieve by compounding were neutralized through loss of ease in manipulation, and more especially through the excessive number of idle revolutions. With these engines, as soon as the ingot left the rolls the steam below the throttle valve of the high-pressure cylinder continued to work, as did also the steam still stored in the receiver between the high and low pressure cylinders, and the engine came to rest only when the whole of the steam in the cylinders was exhausted. This resulted in the waste of both steam and time, owing to so much idle running. Excessive cooling losses also occurred, particularly with condensing engines, and sometimes vacuum was even noticeable in the high-pressure cylinder. The advantages of compound working were, therefore, largely if not entirely discounted. Moreover, at starting, that is, when the maximum power effect is required at the moment of gripping the ingot, the high-pressure cylinders alone did the work, which necessitated the use of very large cylinders in order to meet the requirements of the mill. Cockerill's were the first, in 1882, to remedy this defect, by placing a stop valve in front of the low-pressure cylinders. This stop valve, or cushion valve as it is called, is operated simultaneously with the high-pressure throttle valve. When the engine is stopped the steam from the receiver to the low-pressure cylinder is shut off, so that what is stored in front of the cushion valve cannot continue to work in the low-pressure cylinder and idle running is thereby almost entirely obviated. Further, as the steam thus retained in the receiver acts as a brake to the high-pressure cylinder, a compound engine fitted with a cushion valve is more quickly brought to rest than the old type of high-pressure engine; that is to say, the rolling mill can be worked more quickly. In starting the engine, especially at the moment of maximum load,

* A paper read at the meeting of the Iron and Steel Institute, London, England, May 4, 1910.

the steam stored up in the receiver enables the low-pressure cylinder immediately to work at full power along with the high-pressure. This arrangement was subsequently most successfully developed by the firm of Sack & Kiesselbach, and the steam consumption of their reversing engines was very considerably lowered thereby.

Operation of the New Type Engines in Rolling

The method of operation of such engines is as follows: The driver throws the link full over with the reversing lever; then with the starting lever he partially opens the throttle valve in front of the high-pressure cylinder and the cushion valve in front of the low-pressure cylinder. The engine then starts with throttled steam and late cut-off. As soon as the rolls have gripped the ingot the throttle valve is opened out farther and the working of the machine is controlled by more or less wire drawing the steam. The engine is stopped by shutting both throttle valve and cushion valve together. The driver then throws the link back to the opposite position and repeats the operation as before.

Though this practice assures rapidity of handling, it by no means enables the condition of minimum steam consumption to be complied with. It is absolutely essential, at starting, to obtain diagrams with late cut-off and heavy wire drawing of the steam that the engine may start in any position and maintain an even speed of running. Once the ingot is gripped and the engine is speeded up—that is, during regular rolling—then it is absolutely required, as the condition of minimum steam consumption, that the engine must be adapted to the power requirements of the rolling mill by adjustment of the cut-off. Only on stopping again should the diagrams show late cut-off and a corresponding degree of wire drawing. This, of course, as it is almost unnecessary to mention, is the mode of working the locomotives in general practice.

With this system of control, by means of two levers and with cushion valves, the driver can, at discretion, open the throttle valve full as soon as the ingot is fairly gripped and regulate the engine by means of linking up. This is, however, rather a troublesome business, and, moreover, requires a good deal of intelligence on the part of the man. It has, further, been endeavored by means of suitable devices to oblige the driver during rolling to economize consumption of steam by linking up and opening out the throttle valve, but all efforts in this direction to obtain regular control have proved fruitless. Experience has shown, in fact, that the only solution of the problem is to remove it out of the power of the driver to adjust the distribution of the steam according to his own judgment, and the only means of carrying this into effect is to employ a properly designed single lever control. For rapid manipulation the conditions of such a starting gear require that, at starting and stopping, the diagrams, without intervention on the part of the driver, should show a late cut-off with throttled steam, and during rolling—that is, while running quick—they should show an earlier cut-off in both the high pressure and low pressure cylinders. Further, the starting gear must be so contrived that on stopping the engine the steam to the low-pressure cylinders is shut off by an effective and simple arrangement so as to bring about a cushioning effect. Another essential feature of the scheme is a reliable and quickly working reversing apparatus. The single lever gear has throttle valves in front of the high-pressure cylinders only. In order that the driver may not have it in his power to regulate the speed with these valves and thus waste steam, they are connected to and controlled by the mechanism for shifting the link. When the engine is stopped the link is in mid position and the throttle valves are closed. When the link is thrown over to start the engine the throttle valves are immediately opened automatically and so quickly that no

wire drawing takes place, even when the engine is running at full speed.

Provision for Efficient Starting and Stopping

Thus all conditions as regards the actual rolling are fulfilled, but not those for starting and stopping—namely, diagrams showing wire drawing with late cut-off. The new single lever gear provides for this in the following manner: The slide valve faces are provided with auxiliary ports which when the engine is linked up to a certain amount—that is, when the main slide valve is cutting off steam at 20 to 30 per cent. of the piston stroke—will admit auxiliary steam for a distance of 40 to 55 per cent. of the stroke, which is sufficient to start the engine. The closer up the gear is linked the later is the cut-off of the auxiliary steam, which, however, is only used for starting and stopping, and is automatically shut off during the actual work of rolling. Further, the auxiliary ports are so determined that they reduce the excessive cushioning when the main gear is linked up to give an early cut-off. This construction has also the advantage that it does not involve any increase in the weight in the moving parts. As the auxiliary valve ports are intended to admit only wire drawn steam they are made very small in proportion to the main steam ports, their area being only about one-tenth to one-twelfth that of the latter. The single lever gear has also to fulfill the condition that in stopping the admission of steam from the receiver to the low-pressure cylinder is shut off, an operation which can be effected in the simplest way imaginable.

The dimensions of the low-pressure admission are such that so long as the link is in mid position the steam passage to the low-pressure cylinder remains closed.

The working of the whole arrangement is as follows: When the engine is stopped the lever—that is, the slide block—is the center. The throttle valves in front of the high-pressure cylinders are closed, as is also the admission to the low-pressure cylinder. When the driver moves the lever slightly in either direction the throttle valves open automatically and the main slide valves admit steam for about 20 per cent. of the piston stroke, which is not sufficient, however, in most cases, to set the engine in motion. At the same time the auxiliary ports admit steam for about 40 to 50 per cent. of the stroke, thus giving the engine the necessary turning moment to enable it to start, without allowing it, however, to run away if unloaded, since the steam is strongly wire drawn in consequence of the small area of the auxiliary ports. As soon as the rolls grip the ingot and the driver wants to speed up he moves the lever further over, increasing the admission through the main slide valve. At the same time the auxiliary ports are automatically shut and the driver can now only regulate the speed by adjusting the cut-off, as the throttle valves, the movement of which is governed by the mechanism of the starting gear, are already wide open. Toward the end of the pass the driver can again bring back the starting lever without risk of the engine sticking, for the auxiliary ports again open and give diagrams with wire drawn steam and late cut-off, which automatically increases if the speed becomes too slow, thus giving the necessary turning moment for finishing the billet. Directly the ingot leaves the rolls the driver puts the lever in the center, thereby closing the throttle valves of the high-pressure cylinders and the admission to the low pressure, and the engine stops dead at once. At a convenient point in the main steam pipe a quick-acting stop valve is placed, for the purpose of instantaneously shutting off steam independently of the starting gear in case of danger.

Steam Consumption Cut Down More Than One-Half

Nine engines fitted with this very simple gear are already installed and 11 more are in course of construction. Diagrams taken from these show at a glance that the steam consumption is remarkably economical.

More particularly they show (1) that the output of work of the engine is controlled by regulation of the cut-off, (2) that the proper amount of cushioning takes place and (3) that the number of idle revolutions is very small.

These diagrams were compared with those from a rolling mill engine, published by Ablett* in 1909. The latter indicate regulating by throttling with late cut-off and a very bad distribution of the steam. In comparing them with the author's new diagrams, the cause of the surprising economy in steam obtained with the new engine is quite apparent. A modern rolling mill engine can, in fact, cope with the same amount of work on a consumption of about 35 to 50 per cent. of the quantity of steam formerly required.

It is a comparatively difficult matter to obtain trustworthy results of tests of the steam consumption of a reversing rolling mill engine, and it is therefore intelligible that up to the present no tests have been made on rolling mill engines working under modern conditions, or, say, with a boiler pressure of 140 to 170 lb., with high super heat, and with a vacuum of about 24 in. in the exhaust pipe. The tests so far made have all been performed at considerably lower steam pressure, low super-heat and low vacuum. They have yielded, nevertheless, extraordinarily favorable results. Reference may be made to the 45-hour test on a rolling mill compound engine recently carried out by the Commission on the Power Requirements of Rolling Mills. The mean pressure on the engine was 103 lb., the mean temperature of the steam in the cylinders was 361 degrees F., and the mean vacuum was 23.5 in. The average steam consumption was 350.77 lb. per ton of material rolled down to 9.22 times its original length. Under equal conditions and with the same amount of elongation, the steam consumption was formerly 880 to 1100 lb. per ton. The amount of steam consumed includes the whole of the feed water necessary for the engine, together with all the auxiliary engine and steam pumps for the condenser. As already indicated the figures are comparatively high for the new type of engine, the conditions being not very favorable as regards either steam pressure, super heat or vacuum. Besides which the engine was controlled by throttling and not by adjustment of the admission and cut-off. In the case of a reversing engine in conjunction with a modern steam boiler battery, the steam consumption for a ten-fold elongation would be about 308 lb., as compared with 990 to 1210 lb. in the case of the uneconomical high-pressure engine. With this low steam consumption† the modern reversing compound engine holds the record for the lowest energy consumption per ton of material rolled. As it is also the cheapest rolling mill engine, and unsurpassed by any engine in ease of manipulation, it holds the foremost place as compared with any other reversing apparatus for driving rolling mills, especially the excessively costly motors for electric driving.

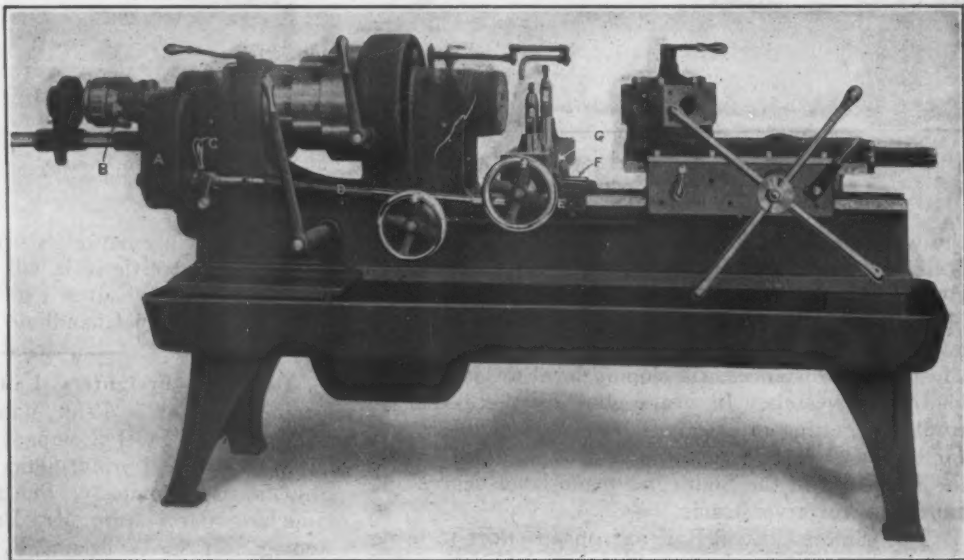
* *Journal of the Iron and Steel Institute*, 1909, No. II, p. 15.
† With steam costing 2s. 6d. per ton, the cost of the steam used per ton of material rolled to 9.22 times its original length, in the case of the engine described, would amount to 5d. When working under modern conditions, and rolling ingots to 10 times the original length, the cost would not exceed 4.375d.

Exhaust Steam Turbine Drives

The high consumption of steam in the older types of rolling mill engines has now led to the adoption of exhaust steam turbines in conjunction with rolling mill plant, but the advantages of exhaust steam turbine driving are in most cases greatly overrated. Some very instructive experiments have also been made in this direction by the above mentioned Commission on Power Requirements of Rolling Mills. The experiments were carried out at the Union Works at Dortmund on engines whose exhaust steam was applied to driving rolling mills. The result showed that the steam consumption of a compound rolling mill engine—that is, a very economically working one—was increased by 35 per cent. by the interpolation of an exhaust steam turbine between it and the central condenser. The experiments led to the conclusion that no economical advantage results from the use of such a turbine, for the chief reason that the extra 35 per cent. of steam used in the reversing engine would be sufficient to develop the same amount of energy in a live steam turbine as would be obtained by means of installing the rather complicated and costly exhaust steam turbine plant.

An Acme Screw Machine with Power Cutting-Off Feed

The Acme Machine Tool Company, 2235 Buck street, Cincinnati, Ohio, has developed a power feed for the cut-off cross slides of its screw machine and turret lathe. This feed is designed for use in facing large castings, forgings and work of a similar nature and can also be used in connection with the cutting-off tool. By the use of a very fine feed, which can be supplied when so ordered, the power feed can be used for forming and similar work. The illustration shows



A 2¼ x 11 in. Screw Machine with Power Feed to the Cut-off Cross Slide, Built by the Acme Machine Tool Company, Cincinnati, Ohio.

the power feed as applied to the company's 2¼ x 11 in. screw machine, which is one of the line illustrated and described in *The Iron Age* December 2, 1909.

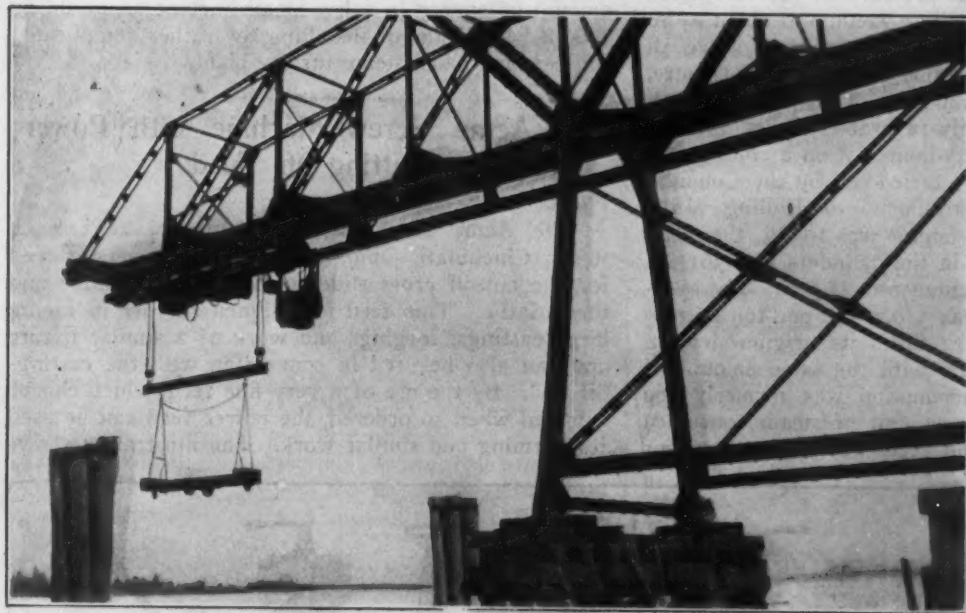
The feed consists of a bracket, A, fastened to the end of the head with bolts; holes are provided in all machines so that this attachment can be applied at any time. The handle B controls the direction of the feed and enables it to be instantly reversed as often as may be desired. Three rates of feed are provided, any one of which can be obtained by shifting the lever C; an index attached to the lever shows the rate in use at any time. The split key type of speed changing mechanism is employed, the power being transmitted through the shaft D to a worm in the worm box E

that engages with a worm wheel on the cross slide screw. The feed can be operated either by hand or by power. For hand operation it is thrown off or on by the lever F, and when operated by power is tripped automatically by the throw-off dogs G.

The Memphis Freight Transferring Plant

Used by the Illinois Central Railroad for Handling Freight from River Boats

The mechanical difficulties in the way of the transfer of freight between railroads and river boats or barges have been responsible to a great extent for the fact that so little use is made of river transportation in the United States. The Mississippi River, for example, is a great waterway on which freight can be transported at a very low cost, but the fluctuations in



A Detail of the Equipment Used by the Illinois Central Railroad at Memphis, Tenn., to Transfer Freight from Boats to Cars.

the water level make it expensive to load and unload freight on boats or barges. In many places along the river, where a large volume of traffic might be developed, there is a difference of 40 ft. between the high and low stage of water and freight must be carried a considerable distance on a sloping level to load or unload river vessels. In years gone by there was no trouble in getting roustabout labor at reasonable wages for this work, but the development of industries along the river and in the South has made labor scarce and expensive for river traffic.

The Illinois Central Railroad, in an effort to bring about a union of the facilities for rail and river traffic, has recently completed an unloading plant at Memphis where freight is taken from river barges or boats by an electric hoist. This equipment has excited a great deal of interest among men identified with river traffic, and it is understood that other railroads are contemplating similar stations for their traffic. There is a difference of about 30 ft. between the high and low stage of the river at Memphis, and no facilities have been available heretofore for handling heavy freight like cotton, logs or lumber satisfactorily. Cotton bales can be rolled down hill at very little expense, and the work can be done rapidly, in transferring from the railroad to a river boat, but in going up hill from the river to the railroad the work is very slow and expensive. The river offers very cheap transportation for collecting logs for saw mills,

but the mills have not been able to take advantage of this economy to any great extent. The chief object sought in building this Memphis plant was to provide facilities for taking freight from the river and loading on cars so as to make the river a feeder for the railroad.

The main feature of the plant is a steel cantilever span, which extends out over the river and carries an electric hoist. The track carrying the hoist is about 70 ft. above the low stage of water, and the span overhangs the river about 60 ft. The span is supported by a steel tower 30 ft. high, erected on a timber and pile foundation or trestle work. From the shore end of the span a timber trestle extends back about 300 ft., this trestle supporting an I-beam which carries the track for the electric hoist. Under this wooden trestle is a loading platform where freight is deposited to be loaded on railroad cars. Two tracks extend along the loading platform one on each side.

A landing barge is used on the river, moored to clusters of piles. The cotton and other freight from river boats or barges is unloaded on the landing barge, and from there is lifted by the electric hoist. To facilitate rapid work and the operation of the hoist at full capacity, low four-wheeled trucks are used, each carrying five bales of cotton. These trucks are dropped to the landing barge where they are loaded, picked up by the electric hoist and carried back to the railroad loading platform. The hoist used is of 15 tons capacity. The plant has been so successful in handling cotton and other package freight that the railroad contemplates an extension which will enlarge its usefulness. It is proposed to extend the trestle so it will straddle a loading track. The hoist can then drop logs on flat or gondola cars without any manual handling.

Two Ore Freighters Launched.—The 10,000-ton steamer Charles S. Price, named for the president of the Cambria Steel Company, Johnstown, Pa., was launched at the Lorain, Ohio, yards of the American Shipbuilding Company, Saturday, May 14. In the launching party were Mr. Price, Fred Krebs, J. L. Repogle, H. C. Wolle and E. D. Rogers of the Cambria Steel Company and F. B. Richards and R. L. Ireland of M. A. Hanna & Co., Cleveland. The new vessel is owned by the Mahoning Steamship Company and will be managed by M. A. Hanna & Co. It is 524 ft. long, 54 ft. beam and 30 ft. depth. At the Wyandotte yard of the American Shipbuilding Company, below Detroit, Mich., the 10,000-ton steamer E. H. Utley was also launched on Saturday. The vessel is named for Col. E. H. Utley, Pittsburgh, vice-president of the Bessemer & Lake Erie Railroad.

The North Fort Smith Improvement Company, Fort Smith, Ark., has been incorporated at \$100,000 for the purpose of building up a factory district adjacent to Fort Smith. The company has applications on file from five different concerns for factory sites.

An Electric Smelting Furnace

The Author's Design for Reducing Iron Ore

BY EDWARD R. TAYLOR, PENN YAN, N. Y.

The applications of electricity to large problems in chemistry in the last few years have been so rapid and wonderful in their character as to awaken the keenest interest. Reactions heretofore impracticable in the old methods of chemistry are becoming so by the use of electric current. It is not alone the extraordinary which attracts the attention by its unexpectedness, but the ordinary reactions are done in extraordinary ways and in extraordinarily large units. It is to one of the common reactions on a large scale that the writer desires to call attention.

Success of the Carbon Bisulphide Furnace

The electric furnace for the manufacture of carbon bisulphide leaves nothing to be desired when applied to reactions

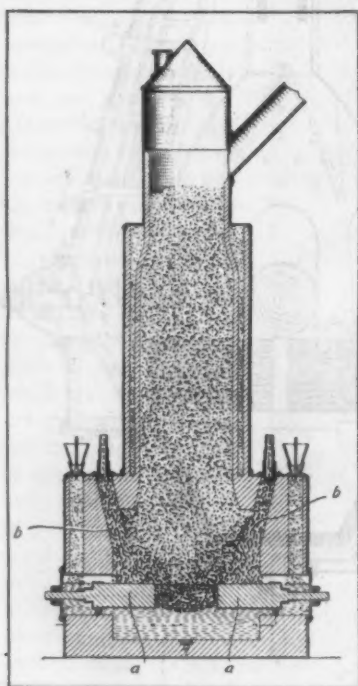


Fig. 1.—The Carbon Bisulphide Furnace.

of that kind either in the application of the electric current or its management. The use of broken or fragmentary carbons feeding upon and between the main electrodes of such a furnace fulfills so important a mission as to make what amounts to a foolproof construction. In practice it has repeatedly been found possible to shut the furnace down completely and when perfectly cool, start it up again with ease and certainty. Fig. 1 shows the arrangement of this furnace, in which at *a* are shown the main electrodes and at *b* the broken carbons falling down upon them and over their ends, the object of which is to take up current from all points of contact with the main electrodes, saving them from heavy wear and carrying the resistance or weakest part of the electric circuit further away from the electrodes themselves and into the center of the furnace, where the heat should be the most intense and concentrated. Sulphur is fed around the periphery of the furnace, and as it melts carries the heat absorbed into the interior. Figs. 2 and 3 show another form of hop, with the main electrodes and the columns of broken carbons falling down upon them and performing the same functions as just described with reference to the carbon bisulphide furnace.

Advantages Possible in Ore Smelting

For several years the writer has been studying the application of these general principles to the electric smelting of metals and especially of iron ores in a construction designed for work on a larger scale. There are several important advantages in such large scale work, and the ability to concentrate the electric

heat in the center of such a furnace adds to the advantage of large scale construction and operation.

In the ordinary blast furnace for smelting iron the heat is very uniformly distributed through the furnace from the bottom upward in such a way as to be very severe upon the lining of the furnace itself. On the other hand, in the electric furnace, with the greatest heat in the center, the lining is not only immune from excessive wear, but may by judicious management be practically relieved of being a lining at all, becoming simply a shell to direct the course and fall of the charge itself, which in a very important sense becomes a movable lining of the furnace. This is very clearly shown in Fig. 2, where the ore mixed with fluxes and with carbon, if desired, is shown descending in the furnace. Screws placed near the periphery in the cool part of the furnace force the descending charge toward and into the central heat zone. The position of these screws is higher in the furnace than the electrodes, as shown in Fig. 3.

In Figs. 2 and 3 is also shown at *c* a sleeve or directive feeder through which charcoal is fed. In Fig. 2 the charcoal is shown to spread out across to join the column of broken carbons on each side, being so directed by baffle walls shown more clearly in Fig. 3.

How the Furnace is Operated

In loading the furnace to start with, the space surrounding the electrodes is mainly filled with charcoal with only sufficient broken carbons to insure the starting of the furnace in the cold condition, and it is designed that this column of charcoal shall always maintain itself between the electrodes to help maintain a high resistance in the furnace and to keep the columns of ore in the four quarters of the furnace from joining each other and thus raising the conductivity of the furnace too high for advantageous working.

Coarse ore with fluxes is fed in at *d*, Fig. 3, and fine ore with fluxes at *e* around the periphery of the furnace. Carbon can be mixed with these columns of ore if necessary for the complete reduction of the ore. It is not intended that ore shall get down between the electrodes, either for reduction or melting, but that both of these operations shall take place at a higher point in the furnace, and that as fast as melted it will run down between the electrodes in drops or streams to the hearth of the furnace. The hearth of the furnace is lined with electrode material, and may be connected with an electric circuit at *f*, the other terminal being *g*, and operated either intermittently or constantly as may be found desirable. Tap holes at *h* and *i*, respectively, are arranged for removing the molten metal and slag from time to time.

By using expanded metal in the construction of the electrodes the conductivity of the metal holder of the carbons is made to extend into the electrodes, thus relieving the carbon part of them of the necessity of carrying all the electricity they deliver through the whole length of their course. In other words, the electricity is taken up gradually from the metal part, and the carbon does not have to do it all until near the end of its duty.

Details of Construction

To facilitate the reduction of the ore there are shown in Fig. 3 baffle plates (these are preferably triangular in shape and placed with the ridge up), around and past which the fine ore descends, leaving a passageway under them, through which carbon monoxide

from the interior hot part of the furnace may pass and reduce portions of the ore then passing into a chamber from which it is exhausted by little fans connected with motors, *j*, on the outside of the furnace by which the carbon dioxide so produced is forced back into the central hot part of the furnace in contact with hot charcoal. The latter again reduces the carbon dioxide to carbon monoxide, which process may be repeated till the gas has reached so high a point in the furnace as to become too cold to react in this way.

While the description of this may seem complicated, it will be noticed in Fig. 3 that the arches supporting these directive channels are simply and easily constructed and are so protected from the heat as to make them very enduring, the aim being to so direct the several descending columns of material as to pre-

and will last during many months of continuous use. The function of conveying electricity into the reaction zone is more regularly and completely done than by an electrode that is moved through the walls of a furnace.

The Action Within the Furnace

The ore and fluxes and carbon all have their regular descent, and the ore as soon as it reaches the temperature of reduction by carbon monoxide is in an atmosphere of that gas. The complete reduction will take place before it reaches the temperature of fusion, for the space in which to move is ample and the approach so gradual that nothing precipitate takes place, and as fast as any portions reach the point of fusion and have sufficient temperature to liquefy drops of molten metal are formed and find their way quickly

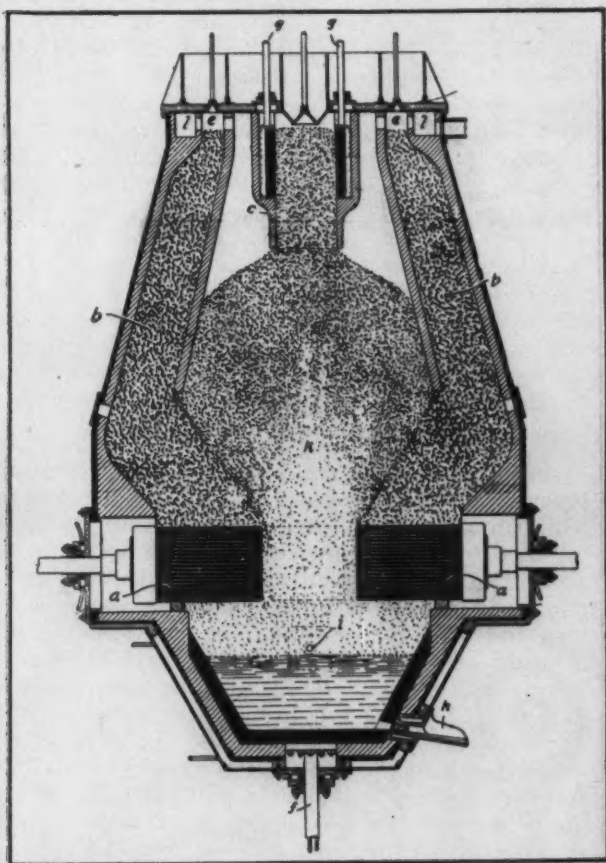


Fig. 2.—Sectional View, Showing the Taylor Electric Iron Smelting Furnace Charged.

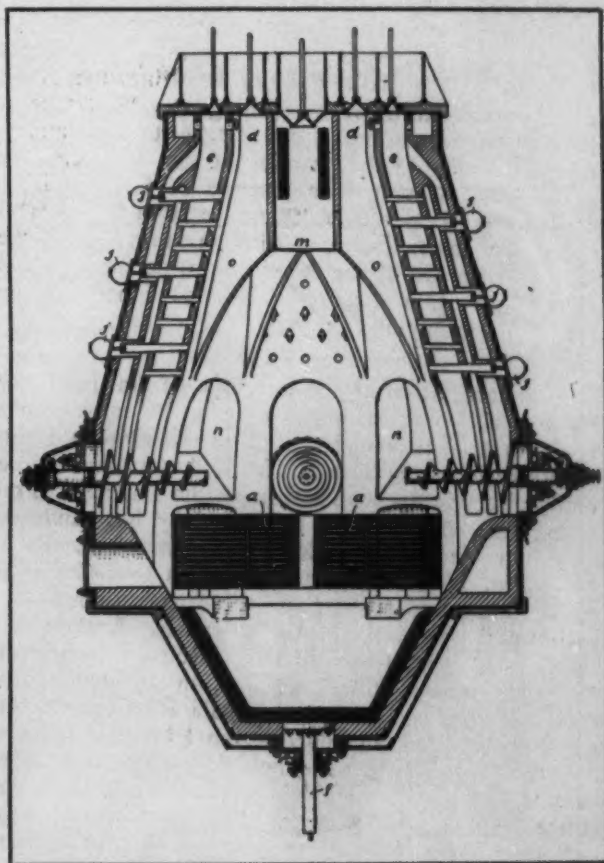


Fig. 3.—Sectional View at Right Angles to that of Fig. 2, with No Charge in the Furnace.

vent either the ore or the reduced iron from making the furnace too conductive of electricity to work regularly and easily, and also to compel the coolest ore to follow down the periphery of the furnace until forced into the interior either by the screws referred to or by the course of its natural descent. It is, indeed, intended that the descending ore should be, as it were, a moving lining of the furnace constantly making its way downward and, at the proper time, into the central heated part of the furnace, saving absorbed heat that in ordinary furnaces would be radiated away and lost for the reaction, while when such material does reach the interior of the furnace it is at so high a temperature as to offer no chilling influence, and heat is applied to the best possible advantage.

Now to examine a little more closely the main electrodes and their reinforcement with broken carbons. The movement of these broken carbons as they wear away takes the place of the movement of the whole electrodes in the common and ordinary use of electrodes. They are in reality a part of the electrode itself, to all intents and purposes. The wear on the electrode proper is comparatively slight, and they do

to the hearth of the furnace preparatory to being tapped off, either as a constant stream of metal, or from time to time, as may be found to be most expedient. Electrodes are provided at the top and at the bottom of the furnace, which may form a circuit (preferably from another source of electricity) either with each other or with the main electrodes. In either case such a current of electricity through the charcoal column *c k* will have a tendency to keep this column in a state of incandescence and in a condition to reduce any carbon dioxide to carbon monoxide that comes in contact therewith. By the circulatory system, already referred to, the reducing of ore and of dioxide to monoxide should be active and often repeated in the course of the gases making their way out of the furnace.

This being a perfectly closed furnace, the gases passing out at *l* may be utilized in gas engines, for heating or other useful purposes. There being no air blown in, there is no active nitrogen to be in the way of active reactions, nor to carry heat away in its exit from the furnace, nor any water vapor introduced by such blasts to absorb heat or interfere with the re-

action of the furnace. The coarse ore is fed in on four sides of the charcoal pyramid, shown from *c* to *k*, Fig. 2, and fine ore in the outer channels as shown in the same figure.

The charcoal spreads out in four ways toward broken carbon channels, shown in Fig. 1, being kept separate from the ore by divisional arches, shown at *m*, Fig. 3, and alternately joins the broken carbons descending through the arches, shown at *n*. The purpose of this arrangement is to divide the ore into four quarters or columns. One main object in these divisions is to interfere with any matting together of reduced iron clear across the furnace with the danger of a hold-up, or the danger of forming so good a conductor from one electrode to another as to short circuit the furnace. The writer has deemed this question the hardest of solution in a stack furnace and feels satisfied that it is fully provided for.

It may be noted again that coarse ore is fed in a column separated from the fine ore that surrounds it, but more or less of the fine ore drops into the coarse as it descends through the openings *o* in Fig. 3, leaving behind it some cooler ore to take its place and to descend nearer to the exterior of the furnace. The object of this surrounding mantle of fine ore is to conserve the heat seeking to escape from the sides of the furnace by radiation, it being an endeavor to make the infusible ore at that temperature perform in this respect the same function that sulphur performs in the carbon bisulphide furnace.

Summation of Features

The fact should not be lost sight of that in reality there is no lining to this furnace in the sense that a lining is ordinarily understood. The charge itself in reality becomes the lining. The shell and channels are really directive agencies to compel the materials to go where desired and to be influenced by heat and the other agencies under predetermined conditions.

In Fig. 3 two of the main electrodes *a* are shown in their arches, and above them the arches *n* communicating with the broken carbon channels. Looking directly ahead and just above the electrodes is shown one of the screws in its arch and, on either side, another view of two screws with half of the arches in which they stand and operate, and above these are clearly shown the two channels down which the fine ore descends upon them. The ore in the outer one of these will always be comparatively cool, for it has only been subject to radiant heat seeking escape that it has absorbed.

Turning again to Fig. 2, the movement of materials can be readily traced. The heat zone is in the center at and below *k*, toward which all the charge of the furnace tends both from the top and the sides. Thus the blanket is constantly renewed from the outside and constantly descending to be tapped away in the form of molten slag or metal.

This furnace is designed to meet the demand that will soon exist for a really large scale furnace for the smelting of ores. For though iron ores are specifically spoken of, it is deemed with slight modifications to be well adapted to the smelting or working of many classes of material.

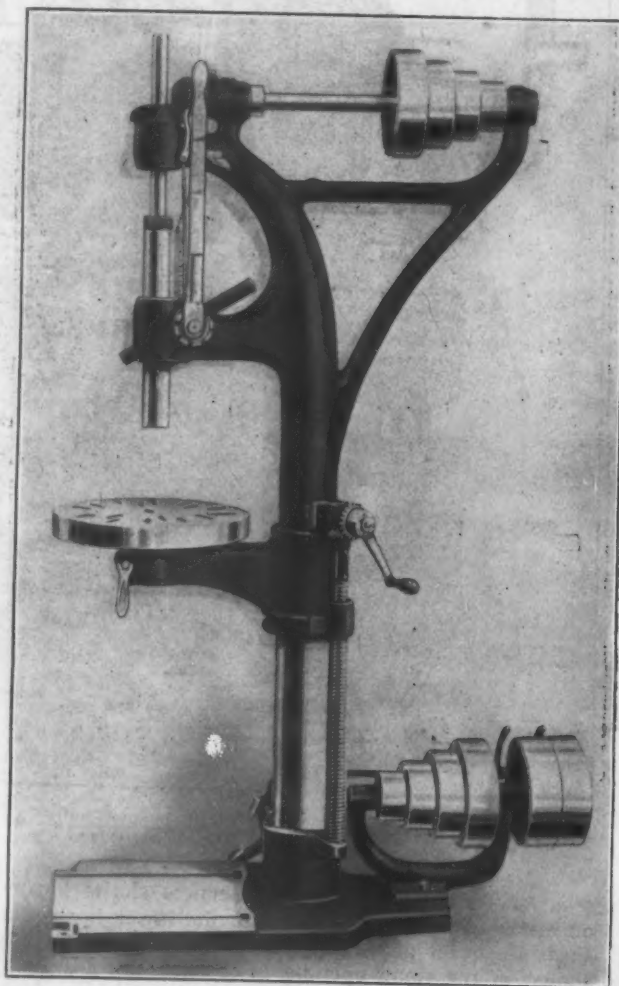
The Diamond Expansion Bolt Company, 90 West street, New York, has made up a pressed steel sample board showing the line of bolts and shields it manufactures. The board is finished in dark green enamel, and on it are mounted bronze and nickel plated samples with name plates indicating the various types. The board serves a dual purpose, as it not only advertises the bolts but is valuable for reference purposes. By glancing at it a purchaser can readily select the bolt best suited for the particular job he has in mind. A pocket is provided at the back of the board in which is inserted a heavy card, which contains full sized reproductions of the actual samples and the dimensions,

correct designation and list prices of every article on the face of the board.

The Modern 20-In. Drill Press

For use where conditions require an exceedingly strong and stiff tool to withstand all kinds of hard usage the Frontier Iron Works, Letchworth and Grant streets, Buffalo, N. Y., is offering the Modern 20-in. stationary drill.

The steel spindle is of large diameter and has a No. 3 Morse taper socket. It is driven through bevel gearing from a cone pulley on the top shaft, which is belt connected to the countershaft on the base of the machine. The gears have cut teeth and are said to be noiseless in operation. The table is mounted on a bracket, which is raised and lowered by a steel elevating screw. In the illustration the drill is shown



The 20-In. Modern Upright Drill Built by the Frontier Iron Works, Buffalo, N. Y.

equipped with lever feed and quick return handle. The starting and stopping of the tool is accomplished by a treadle-actuated belt shifter.

The following are the principal dimensions and specifications of the machine:

Height, inches.....	82
Floor space, inches.....	42 x 15
Diameter of table, inches.....	15½
Diameter of column, inches.....	5
Travel of table, inches.....	15½
Travel of spindle, inches.....	7½
Diameter largest step cone pulley, inches.....	8½
Diameter smallest step cone pulley, inches.....	4
Width of belt, inches.....	2½
Shipping weight, pounds.....	650
Shipping weight boxed, pounds.....	750

This drill is built along the same lines as the maker's general line and is furnished in special metal alloy bearings. It is recommended as being especially serviceable for manufacturing plants, garages and repair shops, and is guaranteed to do accurate work.

The Berg Swaging Machine

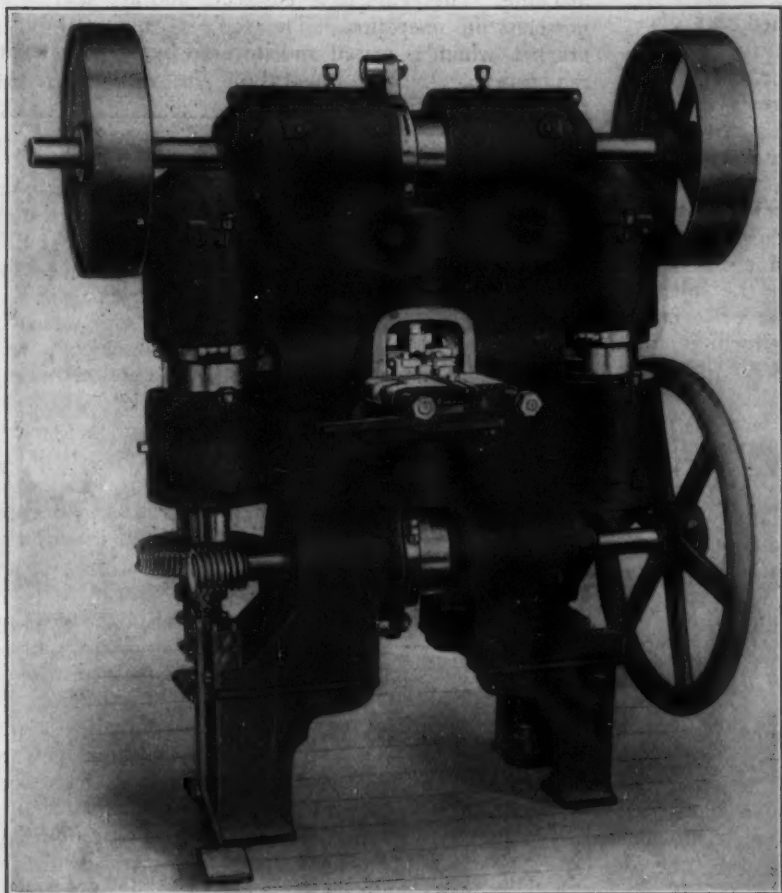
A patent has recently been granted Andrew Berg, Bridgeport, Conn., covering certain improvements in the details of the construction of swaging machines, and assigned by him to the Coulter & McKenzie Machine Company of that city. This company has built the machine shown in the accompanying illustration, embodying these improvements, for producing file tangs.

The frame of the machine is provided with housings in which the main driving shaft carrying the two large driving pulleys, shown in the upper part of the illustration, are journaled. Power is transmitted

ness of the tang equal to that of the body of the file.

The vertical and horizontal shafts and the worm gear at the lower end of the left vertical shaft run continuously and communicate a reciprocating motion to the die-carrying pitmen through the eccentrics at the middles of the shafts. The eccentrics are so adjusted that the pitmen reciprocate in pairs and when the dies in the horizontally moving pitmen are approaching each other, those in the vertical pitmen are receding. Under these conditions, while idle reciprocation of the pitmen takes place, their dies are out of contact with the piece being swaged. When a piece has been placed in position to be swaged the foot treadle is depressed, and the friction clutch below the worm engages, causing the worm gear to drive a short vertical shaft in such a way that it will slowly rotate and by means of eccentrics cause the dies to gradually advance toward each other as fast as the stock is reduced. When this shaft has made a complete revolution a cam projection on the sleeve of the clutch will disengage the clutch and bring the shaft to a state of rest while the pitmen are idly reciprocating.

The operation of forming these tangs has been accomplished in about 4 sec. when the machine was operated by an unskilled boy. All the operator has to do is to place the heated stock in the dies and when the stock is reduced to the desired size the dies automatically open to receive another blank. The machine illustrated weighs about 4000 lb., is 5 ft. high overall, occupies a floor space of 2 x 4 ft., and requires 5 hp. to operate it. The main driving shaft should have a speed of 450 rev. per min., and the pulleys on it are 16 in. in diameter, with a 4-in. face.



The Berg File Tang Swaging Machine Built by the Coulter & McKenzie Machine Company, Bridgeport, Conn.

from this main shaft through vertical shafts located on either side of the machine to the lower horizontal shaft by bevel gearing. The four swaging dies are shown in the small opening in the center of the machine and are secured to reciprocating pitmen, from which they can be detached as often as desired. These pitmen are connected by pivots to arms whose heads are journaled on eccentrics, which in turn are journaled on eccentrics on the four shafts previously mentioned. The work is held in a chuck which is mounted upon and is free to slide along two horizontal studs projecting from the front of the machine. This chuck is held flexibly against the frame by two springs and has a rib projecting above its upper surface to support the piece to be operated upon by the dies. In swaging file tangs the body of the file rests upon the projecting rib of the chuck and is held firmly in position by two jaws, whose movement is controlled by the handle below the chuck and a link connected thereto. The outer end of the blank rests against an adjustable gauge and the forward end projects into the swaging field, where the dies reduce the stock to form the tang. The horizontal dies are tapered to form the tang, and as these reduce the stock the vertically operated dies, which are flat, maintain the thick-

ness of the tang equal to that of the body of the file. The operation of forming these tangs has been accomplished in about 4 sec. when the machine was operated by an unskilled boy. All the operator has to do is to place the heated stock in the dies and when the stock is reduced to the desired size the dies automatically open to receive another blank. The machine illustrated weighs about 4000 lb., is 5 ft. high overall, occupies a floor space of 2 x 4 ft., and requires 5 hp. to operate it. The main driving shaft should have a speed of 450 rev. per min., and the pulleys on it are 16 in. in diameter, with a 4-in. face.

The Machine Tool Trade in Russia.—The Bureau of Manufactures, Department of Commerce and Labor, Washington, D. C., has issued No. 34 of its special agents' series, giving a supplementary report on the machine tool trade in Russia, by Capt. Godfrey L. Carden. This report

treats largely of the important plant of the Kolomna Machine Works Company, at Kolomna, about 72 miles from Moscow. Lists are given of the American and foreign tools in use. The statement is made by Captain Carden that he was strongly impressed with the fact that the value of American machine tools in general had not been brought home, or, at any rate, not successfully at this great plant. He says that some of the best grades of American boring machines, radial drills and vertical millers could with advantage be brought to the attention of the Kolomna management.

The Engineering Agency of South Africa, Johannesburg, states that an important discovery of iron ore has been made in Natal. The ore body is located on a mountain within 75 miles of the coast and having a railroad within 30 miles. Suitable coal for coking purposes has been found in Natal, while limestone exists in large quantities only a mile distant from the ore claims. The ore is hematite, running from 42 per cent. up in metallic iron. The River Tugela, which runs through the iron ore property, is stated to be available for the development of power. Negotiations are pending with a view to placing this property on the market.

Russian Trade Combinations

How They Are Organized and Managed

BY CHARLES J. SMITH, LONDON.

In view of the recent announcement that the Russian Government has undertaken an investigation of the Russian iron and steel combination or "trust," the following article, furnished by one who has had exceptional facilities for securing information relative to the manner in which such combinations have been organized, and are now conducted in that country, has more than passing interest.

Of late years, as a result of the influx of foreign capital and the improved social conditions of the country, the tendency in Russia to form combinations has spread rapidly to the various industries, chief of which are cotton, sugar, wool, petroleum, iron and steel and coal.

A Semiofficial Institution in South Russia

The great factor in the mining and metallurgical industries for some years was the Society of South Russian Mining and Metallurgical Industries. This society, established at Kharkoff, is a semiofficial institution, and possesses rather peculiar powers, mention of which might be made to show in a clearer light one at least of the reasons justifying (according to the promoters) the combination of the various concerns. The statutes of the society compel all mines, whether owned privately or by companies, and all the metallurgical works in south Russia, to contribute to its maintenance. In return the society takes it upon itself to arbitrate in all matters affecting the welfare of the two industries. For instance, questions dealing with workmen, railroads, ports, duty, taxation, &c., are brought before it for a decision, and generally what it says passes into law, so great is its influence. Another useful service which the society renders its members (and all concerns in these two industries necessarily must be members) is that of acting as a banker on a large scale.

Of late, however, its popularity has been on the wane. First, it is thought that the society has not been able to completely meet the wishes of the south Russian concerns by placing them in a position superior to that of the various firms in the Urals, whose competition in the near future they greatly fear. Second, the society has very often been arbitrary in its decisions and has in consequence checked the progress of the ultra-ambitious firms. The belief also exists that, by virtue of its being a semiofficial institution, the society in many cases has leaned toward the Government when called upon to arbitrate in matters at issue between that body and the works, especially in regard to taxation, over which there is continual bickering. On the other hand, it must be admitted that it has been responsible for the continued existence of many of the smaller firms, so that opinion is divided.

The fact, however, of the society being able to keep the small firms going gets that body into the bad graces of the larger concerns, which naturally would like to see the small ones out of the way. The large concerns are not, however, in a position to totally ignore it, first, because they are bound by law to support it, and, second, because of its strong financial position and the help it is able to extend to its friends. Looking at the question from various aspects, it is plainly evident that there is a tendency on the part of many firms to act more independently of the society than has been the case for many years.

The Government Not Indifferent

Undoubtedly troubles are ahead as the result of the formation of these many syndicates and combinations. For instance, one looks for a collision between the Government and the combinations, for already the

authorities have made it perfectly clear to all that they are determined to have a say in the matter. The Government has emphatically stated that it will not permit the infringement of Article 1180 of the Penal law, which declares illegal those combinations formed with the object of raising the prices of necessities, or the abnormal lowering of prices with intent to injure the action of purchasers, and thus prevent the supply in increased quantities of necessities. Furthermore, as there is the possibility of Article 1180 not being found strong enough when the occasion of its being put into operation arises, a special bill, designed to check the formation of dangerous syndicates, is up before the Duma for consideration.

With regard to combinations in the mining and metallurgical industries, it must be stated that owing to the conditions which have existed of late years the Government has done little to check the development of syndicates not of the nature of the proposed South Russian iron pool of 1909, which was abandoned because the Government refused to grant the concessions desired by the promoters. These combinations as yet, however, are not undesirable factors in the Russian markets. They are the means of organizing the industries for their immediate good without imposing severe restrictions. At present the regulations introduced by them are somewhat elastic in their nature, as evidenced by the underbidding which is permitted when the great centers—namely, the Urals, Poland and the Donetz Basin—are quoting. What powers these syndicates will possess later on, and what regulations they will frame in consequence, the future only will show. At present it can be taken for granted that they have no idea of "cornering" the market; rather are they very much concerned over the question of legalizing their position in the eyes of the Government.

How the Combinations Are Formed

To comply with, or perhaps evade, the law, these combinations take the shape of registered companies, ostensibly formed with the object of purchasing and selling certain goods. In reality they are cartels, seeing that in each case the capital is purely nominal and that the stock is neither transferable nor quoted on the exchange.

The rule of each combination provides that the stockholders shall sell exclusively to it; in other words, they transact all their business through it, and not directly with their customers. It is rather interesting to note that should a stockholder break his contract with his combination that body does not as a rule take action at law for the simple reason that many cases when brought to the courts have been non-suited on the ground that combinations are illegal. The penalty for breach of contract takes the form of a boycott.

As regards the placing of orders passed on to the combination, they are distributed in a certain pre-arranged proportion, generally according to the average of production of each firm before it joined. To prevent overproduction the combination closes small factories and compensates the owners out of the general profit.

The effect on the metallurgical industries as the

result of the formation of these combinations has been a slightly increased output, with a corresponding rise in prices, as will be seen by the following:

	November, 1908. Rubles.	November, 1909. Rubles.
Pig iron: Foundry No. 1.....	29.76	30.24
Pig iron: Hematite.....	25.44	25.92
Merchant iron, standard.....	59.52	74.70
Hoop iron.....	65.52	80.40
Roofing sheets: Ural.....	151.36	*151.36
Roofing sheets: Donetz.....	148.56	*148.56
Steel plates.....	96.00	96.96
Balls, Government type.....	84.48	84.48
Structural shapes.....	72.00	72.00

* The Ural concerns, with few exceptions, have not joined the combinations, and this illustrates a case in point where, provided the Ural prices do not rise, those ruling in south Russia could not be increased. Increased south Russian prices would mean more orders for the Urals from north Russia, which would enable the Ural concerns to reduce their prices, even perhaps below those of the south Russian concerns. It is a known fact that, consequent upon increased business, the Ural concerns would undoubtedly reduce their prices.

The Powerful Prodamet, the Steel Syndicate

One of the most formidable combinations is the one styled "The Company for the Sale of Products of the Russian Metallurgical Works." This company, for the sake of brevity styled "Prodamet" (meaning sale of metals), was formed by a group of French and Belgian capitalists in 1902 to control the sale of steel plates. In that year Prodamet controlled only about 60 per cent. of the output of the Donetz Basin, but since then, many important firms having joined the syndicate, it has obtained the monopoly of the sale not only of steel plates, but of beams, channels, axles, tires, cast iron pipe and fittings, and merchant and other bar iron. It is expected that pig iron will shortly figure in the list.

Prodamet now represents 67 works (excluding the rolling mills), which are made up as follows: Steel plate companies, 20; beams and channels, 10; axles and tires, 7; cast iron pipe, 6; merchant and other bar iron, 24.

In addition, all the rolling mills of south Russia, north Russia and Poland have joined the combination. The Ural concerns have up to the present refused to come in, much to the annoyance, let it be said, of those firms already part and parcel of Prodamet.

As Prodamet is proving itself to be a mighty factor in the Russian metallurgical world, in spite of the Mining and Metallurgical Society referred to in the beginning of this article, it might not be amiss to give some account of its constitution, its method of dealing with antagonistic firms or recalcitrant members, and its power to control prices.

Like the syndicates formed by firms engaged in other industries, Prodamet is nothing more nor less than a cartel, composed of firms agreed for a term of three years to sell to it their entire production. Its headquarters are in St. Petersburg, and it acts as a central sales office.

To control the purchasing market Prodamet employs two weapons—the boycott and the special dealers' discount. In the case of the boycott, dealers purchasing sheet iron outside the syndicate would find it impossible to buy beams from it, which undoubtedly would be a serious matter, seeing that Prodamet might control the entire output of beams. The discount is allowed to large dealers to enable them to profit on the retail trade, but no dealer enjoys this discount unless he purchases exclusively from or through Prodamet.

With regard to Prodamet's control of prices, it has regulated them in such a manner that a purchaser in the Donetz Basin may buy metal from Moscow at a price, including freight, not higher than that of the metal directly at hand in the Donetz Basin. Similarly, the Moscow man would pay no more for Donetz Basin metal put down in his city than he would for the local market.

It is the general opinion that Prodamet, although organizing the iron works proper, will eventually dis-

organize allied industries. For instance, many iron works have already extended their sphere of operations and have included engineering in their list. Thus, Mariupol-Nikopol is fully equipped for making the large welded tubes required for the Baku-Batoum oil conduits; the Dnieprov Works at Kamenskaya, south Russia, is making boilers and iron roofing to measure; the Alexandrovsk-Briansk Works, at Ekaterinoslav, is in the market for the manufacture of light rolling stock, while the Bieshitza-Briansk Works, at Bieshitza, makes boilers, agricultural machinery and bridges.

The engineering firms are thus face to face with serious competition, seeing that, while the non-syndicated firms have to purchase at syndicate prices, those within the syndicate can reckon the iron they use at any figure they find convenient, which makes a very great difference. It may be explained here that the syndicate has arranged that the amount of syndicated iron that works may use in their own engineering shops is considered part of the share of orders assigned to them by the syndicate.

Produgol, the Coal Syndicate

As coal mining is closely united to the metallurgical industry, it will be of interest to give some details of the operations of the coal syndicate, entitled "The Company for the Sale of Donetz-Basin Coal," otherwise known as "Produgol" (sale of coal). Originally formed in 1906 by 12 firms, Produgol now numbers 20 companies and controls over 60 per cent. of the coal of the Donetz Basin. The subscribed capital is \$500,000.

Produgol is worked on the principle of each colliery participating with a given quantity, a standard price being fixed for the various qualities of coal; all profits are divided among the interested collieries. In 1908, in the second year of its existence, Produgol sold over 6,000,000 tons of coal and about 500,000 tons of coke. The commission on these sales amounted to \$300,000.

It must not be supposed that Produgol enjoys the same power in its particular sphere, as is the case with Prodamet in the metallurgical world. There are so many coal mines owned and worked by small firms that it is impossible for Produgol to buy up or otherwise control all the mines in this part of the Russian Empire. The small firms have resolutely refused to join the syndicate, and here is Produgol's greatest obstacle in its endeavors to monopolize the business. The cost of their upkeep, in comparison with that of the larger concerns, being small, these smaller firms can underbid the syndicate, and, as the aggregate of their output is large, the syndicate cannot run up the price. Another important point to consider is that the small firms can close down without serious loss during periods when the demand is small or prices are too low. In the case of the large mines, this is almost an impossibility.

Syndicates have been formed in practically every Russian industry of importance. In those industries allied to mining and metallurgy can be mentioned the Union of Locomotive Works, the Truprodazha Company (manufacturing wrought pipe, &c.), and "Prodarud," otherwise known as the "Combine of Iron Ore Mines of Krivoi Rog." It may be safely assumed that if the various syndicates keep within reasonable limits, and do not bring about a crisis, we shall see more Russian products on the foreign markets than is now the case. The Russian firms are determined not only to control their home markets but to go abroad. Their debut has been satisfactory, and now it only remains to see what success attends their future efforts. Perhaps we shall see the practical realization of the assertion of a well-known German authority: "Russia, when called upon, can produce everything and anything. She is a country rich in foodstuffs, in forests, in minerals and metals."

CURRENT METAL PRICES.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL— Bar Iron from store—		Genuine Iron Sheets— Galvanized.		METALS— Tin—	
Refined Iron:		Nos. 22 and 24.....		Strait's Pig.....	
1 to 1 1/4 in. round and square.....		No. 26.....		Copper—	
1 1/4 to 1 1/2 in. x 3/4 to 1 in.....		No. 28.....		Lake Ingot.....	
1 1/2 to 1 3/4 in. x 1 to 1 1/2 in.....		Corrugated Roofing—		Electrolytic.....	
Rods—3/4 and 1-1/2 round and square.....		2 1/2 in. corrugated.....		Casting.....	
Angles:		No. 24.....		Spelter—	
8 in. x 1/4 in. and larger.....		No. 26.....		Western.....	
8 in. x 3/8 in. and 1/2 in.....		No. 28.....		Zinc.	
1 1/4 to 2 1/4 in. x 1/4 in.....		Tin Plates—		No. 9, base, caaks.....	
1 1/4 to 2 1/4 in. x 3/8 in. and thicker.....		American Charcoal Plates (per box.)		Lead.	
1 to 1 1/4 in. x 3/8 in.....		"A.A.A." Charcoal:		American Pig.....	
1 1/4 x 1/4 in.....		IX, 14 x 20.....		Bar.....	
1 1/4 x 1/2 in.....		A. Charcoal:		Solder.	
1 1/4 x 1/2 in.....		IX, 14 x 20.....		1/2 & 3/4, guaranteed.....	
1 1/4 x 3/8 in.....		American Coke Plates—Bessemer—		No. 1.....	
1 1/4 x 3/8 in.....		IX, 14 x 20.....		Refined.....	
1 1/4 x 3/8 in.....		American Terne Plates—		Prices of Solder indicated by private brand vary ac-	
1 1/4 x 3/8 in.....		IX, 20 x 28 with an 8 lb. coating.....		cording to composition.	
1 1/4 x 3/8 in.....		Seamless Brass Tubes—		Antimony—	
Tees:	1 1/4 in.....	List November 13, 1908.		Cookson.....	
	1 1/2 in.....	Brass Tubes, Iron Pipe Sizes—		Halletts.....	
1 1/2 to 2 1/4 in. x 1/4 in.....		List November 13, 1908.		Other Brands.....	
1 1/2 to 2 1/4 in. x 3/8 in.....		Copper Tubes—		Bismuth—	
8 in. and larger.....		List November 13, 1908.		Per lb.....	
Beams.....		Braze Brass Tubes—		Aluminum—	
Channels, 3 in. and larger.....		List August 1, 1908.		No. 1 Aluminum (guaranteed over 99% pure), in ingot	
Bands—1/4 to 3/8 x 3-16 to No. 8.....		High Brass Rods—		for remelting.....	
"Burden's Best" Iron, base price.....		List August 1, 1908.		Rods & Wire.....	
Norway Bars.....		Roll and Sheet Brass—		Sheets.....	
Merchant Steel from Store—		List August 1, 1908.		Old Metals.	
per lb.....		Brass Wire—		Dealers' Purchasing Prices Paid in New York	
Bessemer Machinery.....		List August 1, 1908.		Copper, Heavy cut and crucible.....	
Toe Calk, Tire and Sleigh Shoe.....		Copper Wire—		Copper, Heavy and Wire.....	
Best Cast Steel, base price in small lots.....		Carload lots mill 14 1/2¢		Copper, Light and Bottoms.....	
Sheets from Store—		Copper Sheets—		Brass, Heavy.....	
Black		Sheet Copper Hot Rolled, 16 oz (quantity lots) 18¢		Brass, Light.....	
One Pass, C.R.		Sheet Copper Cold Rolled, 1¢ advance over Hot		Heavy Machine Composition.....	
Soft Steel.		Rolled.		Clean Brass Turnings.....	
R. G.		Sheet Copper Polished 20 in. wide and under, 1¢		Composition Turnings.....	
Cleaned.		square foot.		Lead, Heavy.....	
No. 16.....		Sheet Copper Polished over 20 in. wide, 2¢ square		Lead, Tea.....	
No. 18 to 24.....		foot.		Zinc Scrap.....	
No. 22 and 24.....		Planned Copper, 1¢ square foot more than Polished.			
No. 26.....					
No. 28.....					
Russia, Planished, &c.					
Genuine Russia, according to assort-					
ment.....					
Patent Planished, W. Dewees Wood.					
No. A, 10¢; B, 9¢ net					
Galvanized.					
Nos. 14 to 16.....					
Nos. 22 to 24.....					
No. 26.....					
No. 28.....					
No. 20 and lighter 36 inches wide, 35¢ higher.					

